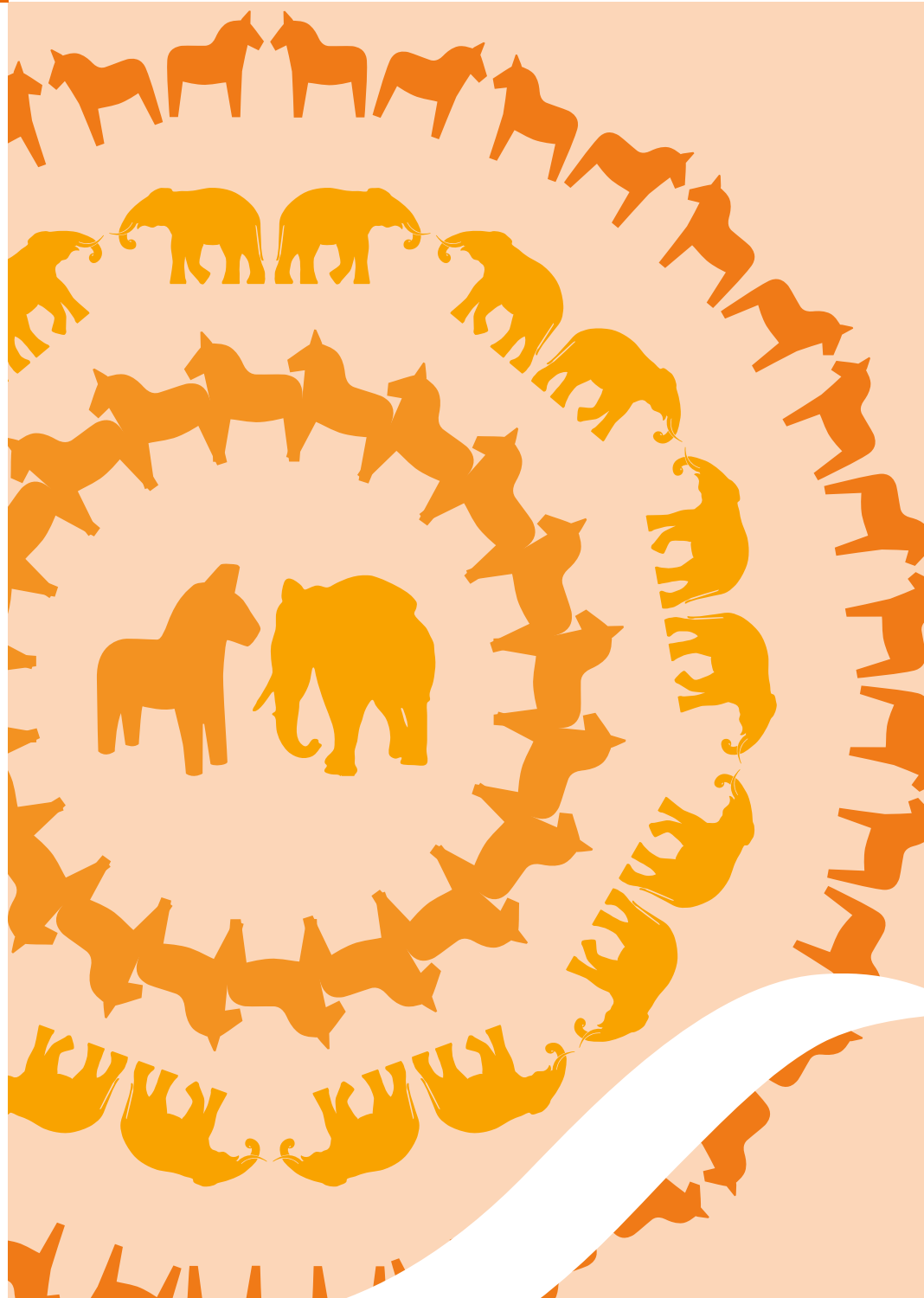


The EU Ecodesign and Labelling system

LED specifications relevant for Indian use



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LED specifications relevant for India

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Two main approaches to standards and specifications

There are broadly two approaches to developing specifications for light sources, regardless if they are used for minimum energy performance standards (MEPS), labelling or simply as guidelines for procurement and similar exercises.

1. Specifications independent of technology focusing of (energy) performance to deliver a specific function (such as in Europe)
2. Specifications defining efficiency and quality for a certain technology (such as the Indian CFL standard, the IEA 4E SSL performance tiers, the EU CFL quality charter or the EU Premium Light project).

India currently has no standard for LED lamps.

1. Specifications independent of technology focusing of (energy) performance to deliver a specific function

The European ecodesign regulations and specifications for the mandatory energy label in principle represent a technology neutral approach (although provisions for a specific technology's have been made in the EU regulatory process). Here, an equation defines a minimum lumen/watt relationship depending on the luminous flux of the light source, taking into account that light sources with higher luminous flux have a higher efficiency. The curve is thus progressive, and in the EU labelling regime, a CFL and a LED lamp can both achieve the same rating in the comparative label scale.

In principle, the European approach is thus independent of the technology used to deliver the light. It does, however, take into account that different kinds of light sources do deliver different services and quality of light. A point light source such as a clear incandescent lamp provides a different light than a diffuse light source such as a frosted incandescent lamp. When the EU phased out the traditional incandescents, various minimum energy efficiency levels were defined for lamps providing light equivalent to a point or a diffuse source of light. It is currently easier to produce an efficient compact fluorescent or LED lamp that provides diffuse light. It is impossible with a CFL and still very challenging with an LED lamp to mimic a clear incandescent lamp (point source). Therefore, a halogen-based technology is allowed for point light sources, whereas performance levels equivalent to those delivered by CFLs or LED lamps are required for diffuse light sources.

Similar considerations are made in the European legislation for directional lamps, etc. As a consequence, the European legislation is very complex but intends to harvest as much as a possible of the potential savings in each application.

The easiest way to access the EU legislations is through the ecodesign portal of eceee, the European Council for an Energy Efficient Economy:
<http://eceee.org/ecodesign/products>

The US standard is formulated in different ways from the EU ecodesign requirements, but generally has the same ambition to establish minimum performance levels across the field of several lighting technologies. Just as in the EU, there are loopholes and exemptions. Revised MEPS are currently being drafted.

The US regulations are unique in the sense that they have developed a very long-term “back-stop standard”: Should all other measures fail, the US has adopted a requirement that a minimum energy performance level of 45 lm/W must apply to all lighting technologies no later than 2020. This still allows for more stringent levels to be introduced earlier than 2020.

The Australian MEPS for light sources are in many ways similar to those of Europe.

2. Specifications for specific technologies

The Indian CFL standard is a good example of a specification used to standardise a specific type of technology. Whereas the EU regulation focuses on drastically improving efficiency for the field of lighting services, the Indian standard focuses on the performance of CFLs in terms of efficacy, safety or quality.

US Energy Star specifications are another example of specifications applicable for certain technologies. There is one specification for CFLs and one for LED lamps. It should be noted that the Energy Star specifications primarily are intended as a voluntary label for lamps. The specifications are thus more stringent than the US MEPS. However, some Energy Star specifications have now been adopted as MEPS in the US. See http://www.energystar.gov/?c=lighting.pr_lighting_landing

India currently has no LED standard, but the following international standards and/or specifications are seen as relevant for India in its endeavours to introduce quality and efficiency requirements for LEDs.

International LED specifications

IEA 4E SSL

The IEA 4E SSL performance documents for LED products are developed by a consortium of ten countries under auspices of the International Energy Agency. This international collaboration brings together the governments of Australia, China, Denmark, France, Japan, The Netherlands, Republic of Korea, Sweden, United Kingdom and United States of America. China works as an expert member of the 4E SSL Annex.

The SSL Annex has developed so called performance tier documents for six LED product categories (published or to be published soon):

1. Non-directional Lamps for Indoor Residential Applications
2. Directional Lamps for Indoor Residential Applications
3. Downlight Luminaires
4. Linear Fluorescent LED Lamps (coming soon)
5. Linear Fluorescent LED “Retrofit” Lamps (coming soon)
6. Outdoor Lighting (Street Lighting)

These documents contain specifications for a number of criteria, of which energy performance is but one parameter. Parameters such as colour rendering, life and flicker are also very important, as are some safety-related criteria. However, the IEA 4E SSL performance tiers do not specify safety requirements in detail since it is often sufficient to refer to already established national regulations.

The IEA 4E SSL performance tiers typically specify three levels based where the top level is based on global top-performing products. The mid-level is more or less equivalent to quality products widely found on the market, whereas the performance of the lowest level represent a more robust and affordable technology level. The performance tiers are simply recommendations for LED specifications that can be applied by any type of organisation, be it a government looking to establish a mandatory standard or a funding agency that looks for product requirements in a funding programme. The IEA 4E SSL Annex performance also offer values for comparing LED products with incandescent equivalents, where applicable.

It is strongly recommended that countries and economies base any standard or specification on the IEA 4E SSL performance tiers. These tiers represent an internationally coordinated effort to harmonise performance requirements around the globe and they are based on market research undertaken by experts in all participating countries.

As an Appendix the first of the above six documents is attached. It is recommended to always visit the IEA 4E SSL web site to get access to the most updated documents.

<http://ssl.iea-4e.org/task-1-quality-assurance>

Off grid products

Specifications for off-grid products were previously part of the 4E SSL performance tiers, but have been taken out of the documents. In the first quarter of 2014, the off-grid product specifications will be republished as a separate, stand-alone document.

Products for tropical climates – lites.asia

The lites.asia programme has developed recommendations for LED products to be used in tropical conditions. These recommendations can be combined with the IEA 4E SSL requirements in the performance tiers.

lites.asia's recommendations are attached as an appendix. The lites.asia web site also provides links to some Asian standards. <http://www.lites.asia>, see "Documents for discussion and outputs".

Specific LED requirements in the EU lamp regulations

The EU ecodesign regulation has some specific requirements for LED technologies as it has for CFLs (despite what has been said above on the "technology neutral approach" of the EU regulations). For instance, there are specific regulations on the required luminous flux allowed for a CFL or LED lamp to be marketed as a replacement for a given incandescent wattage.

There are also specific requirements on LEDs and CFLs respectively such as minimum life, lumen depreciation, colour rendering, etc.

Indo-Swedish collaboration on energy efficiency, 2011-2014

The Swedish Energy Agency and the Bureau of Energy Efficiency (BEE) cooperates within the field of energy efficiency. The overall objectives are to establish agency cooperation, to facilitate business cooperation and to enhance capacity building. The project focuses on energy efficiency measures and management in industry and in buildings, and on minimum energy performance standards and labelling. The agencies also share experiences on communication strategies and outreach activities for more energy efficient behaviour.

The Indian and Swedish governments signed a Memorandum of Understanding on Indo-Swedish cooperation within the field of renewable energy in 2009.



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