

# ELI

Efficient Lighting Initiative



## What Should an Electrician Know about Lighting

### A Handbook for Electricians

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Within the framework of the ELI<sup>1</sup> programme, the handbook dealing with interior lighting called “**What should an electrician know about lighting**” has recently (April 2002) been being put together at SEVEN, o.p.s. The Energy Efficiency Centre. The handbook is intended primarily for electricians, who carry out domestic wiring and lighting leads of confined extent. Since it is just them who have to cope with an issue of lighting within the scope of wiring in households, offices and public facilities. Customers also rightly expect their electrician to be able to provide competent advice on the lighting issues. From electrician’s point of view, however, lighting typically represents relatively small part of his professional engagement and he usually lacks time to occupy himself with this issue more thoroughly, study complicated technical literature and follow new trends in the field.

The aim of the handbook is therefore to provide, despite the limited space, all needed substantial theoretical and particularly practical information in a well-arranged, lucid and comprehensive manner, which would assist an electrician to get better oriented in the field of interior lighting. The desirable outcome should not only be a competent electrician but also and primarily a suitable, energy efficient and aesthetically pleasing lighting in a flat or office and a satisfied customer.

**The supposed extent of the handbook is 40 to 50 pages of A4 size.**

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<sup>1</sup> The IFC/GEF Efficient Lighting Initiative (ELI) is a three-year program designed by the International Finance Corporation (IFC) and funded by the Global Environment Facility (GEF) to accelerate the penetration of energy-efficient lighting technologies into emerging markets in developing countries. ELI will lower market barriers to efficient lighting in Argentina, the Czech Republic, Hungary, Latvia, Peru, the Philippines and South Africa through a set of multi-country initiatives, local and global partnerships, and interventions tailored to individual country conditions.

# A Brief Summary of the Handbook

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## 1. Light sources

The chapter deals with light sources suitable for indoor lighting i.e. mostly incandescent and fluorescent lamps. Its individual sorts, features, advantages and disadvantages are detailed. The emphasis is laid on energy efficiency of the sources expressed in terms of a lumens-per-watt performance and areas of their possible application. A comparison of incandescent and fluorescent lamp from an economic point of view is carried out at the end of the chapter.

## 2. Ballasts

A division of ballasts (a necessary supplement of discharge light sources) into three fundamental types including explanation of their operational principle is provided within the chapter. Individual types of ballasts are further compared in terms of energy efficiency. Possible ways of fluorescent lamp starting, impact on rated life of a lamp and compatibility of different lamps and ballasts regarding starting method are discussed in detail. Last but not least, possibilities of luminous flux regulation (dimming) are set out in the chapter.

## 3. Luminaires

Essential lighting-engineering features of luminaires are mentioned in the introduction to this chapter. The main attention is paid to a spatial distribution of a luminous flux, luminaire efficacy, an utilisation factor and glare prevention. Electrical features are briefly reviewed. There are also optical systems of luminaires detailed in relation to luminaire efficacy and overall energy efficiency of the lighting system.

## 4. Principles of indoor lighting

This chapter provides a summary of basic principles of appropriate lighting, which are derived from a key concept of "visual well-being". A meaning of daylighting is commemorated in link up to artificial lighting and a description of combined lighting is provided. There are further stated essential requirements on artificial lighting, primarily on illuminance and other lighting-engineering quantities and parameters. This is followed by a discussion of most common mistakes in artificial lighting.

## 5. Lighting design

A step-by-step description of lighting design process is given in this chapter. The meaning of furnishing project is punctuated and a brief list of required input data for design are set out. This is illustrated by examples of energy efficient solutions for a room and a corridor in a house. Most frequent mistakes in lighting designs are analysed and part of the chapter is also illustrative chart of specific wattage for some basic types of rooms.

## 6. Applications

Advice and basic rules for lighting various types of spaces, which an electrician is supposed to encounter in an exercise of his profession, are summarised in this part of the handbook. An emphasis is laid in particular on smaller interiors in housing (a description of lighting in individual rooms of a flat is described) as well as in commercial and public administration sphere. Description of typical lighting in an office, small workshop, shop and corridor inside a house is also included.

## 7. Wiring for lighting

The aim of this chapter is not to provide comprehensive overview of wiring, it is not, with respect to the range of the book possible. The purpose is rather to pinpoint some particularities of wiring for lighting. It comprises considerations regarding the grid type, choice of wires, choice of apparatus, placing switches and circuit protection. There are also set out recommendations concerning number of lighting circuits, procedures of their reconstruction.

## 8. Important technical terms and quantities

This chapter provides an explanation of technical terms in the field of lighting used in the book as well as definitions of essential light quantities such as luminous flux, illuminance etc.

## 9. List of standards and regulations

There is a list of standards and regulations related to the field of wiring, lighting technology and fire safety.

## 10. Commercial supplement intended for presentation of manufacturers and suppliers of lighting technology

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For further information on ELI please contact:

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