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Annex C of WTO Notification Document

**Code of Practice
on
Compact Fluorescent Lamps**

**under
the Mandatory Energy
Efficiency Labelling Scheme**

Electrical and Mechanical Services Department

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Code of Practice on Compact Fluorescent Lamps

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Appendix 1	Energy Label Design and Format

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Code of Practice on Compact Fluorescent Lamps

1 Introduction

- 1.1 The Government proposes to implement a mandatory energy efficiency labelling scheme (EELS) for specified electric appliances in Hong Kong. The compact fluorescent lamps (CFLs) will be included, amongst other products, in the initial phase of the mandatory EELS.
- 1.2 For the mandatory EELS, a “Grading Type” energy label will be adopted for CFLs.
- 1.3 New legislation will be introduced to implement the mandatory EELS. The Code of Practice on Compact Fluorescent Lamps (the Code) is to be issued under the new legislation.
- 1.4 The Code sets out the technical details for compliance with the labelling requirements for CFLs under the mandatory EELS, including the scope, appliance classification, test standards, energy efficiency grading, format of energy label and manner of labelling.

2 Scope

- 2.1 The mandatory EELS shall apply to electrically operated CFLs which –
 - (a) with a built-in control gear or with a separate control gear, use the mains electricity as the prime power source; and
 - (b) have a rated lamp wattage up to 60 watts.
- 2.2 The mandatory EELS shall not apply to cold cathode fluorescent lamps.

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3 Definitions

Unless otherwise specified, the following definitions shall apply throughout the Code:

<i>ageing period</i>	means the time required for the initial burn-in of the lamp.
<i>ballast</i>	means a device used with an electric-discharge lamp to obtain the necessary circuit conditions (voltage, current, and wave form) for starting and operating.
<i>CIE</i>	means International Commission on Illumination. (the latest edition of the standard shall be followed)
<i>cold cathode fluorescent lamp</i>	means a type of lamps whose principle of illumination is same as that of conventional fluorescent lamps except that it does not require heating of electrode during starting and operating, and it operates at a much higher voltage and lower current to start and maintain the discharge.
<i>compact fluorescent lamp</i>	means any type of small diameter fluorescent lamp which has a single cap with or without built-in control gear for operation.
<i>control gear</i>	means all necessary electrical elements that are required for starting and maintaining stable operation of the lamp.
<i>Government</i>	means the Government of the Hong Kong Special Administrative Region.
<i>IEC</i>	means International Electrotechnical Commission. (the latest edition of the standard shall be followed)
<i>integrated type CFL with built-in control gear</i>	means a single integrated assembly of lamp, ballast, and lamp base or a two-part CFL that fits into a standard incandescent lamp socket.
<i>life to 50% failures (average life)</i>	means the length of time during which 50% of the compact fluorescent lamps reach the end of their individual lives.
<i>lumen maintenance</i>	means the luminous flux of a lamp at a given time in the rated average life of a lamp, including the initial operating hours, divided by the initial value of the luminous flux of the lamp and expressed as a percentage of the initial luminous flux.
<i>luminous efficacy (lm/W)</i>	means a ratio of luminous flux emitted by a lamp to the electrical power consumed by the lamp.
<i>luminous flux (lm)</i>	means a quantitative measure of light emitted by a light

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source. The quantity is derived from radiant flux (power in watts) by evaluating the radiation in accordance with the spectral sensitivity of the standard eye as described by the CIE Standard Photometric Observer.

<i>mains electricity</i>	means the electricity supply at a voltage of 380/220V and a frequency of 50Hz in Hong Kong.
<i>non-integrated type CFL without built-in control gear</i>	means a separate lamp that is electrically connected to a permanently-wired external ballast.
<i>rated energy consumption</i>	means the power input marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>rated frequency</i>	means the frequency marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>rated life to 50% failures (rated average life)</i>	means the life declared by the manufacturer as being the expected time at which 50% of any large number of lamps reach the end of their individual lives.
<i>rated lumen maintenance</i>	means the lumen maintenance marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>rated luminous flux</i>	means the luminous flux marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>rated voltage</i>	means the voltage marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>rated wattage</i>	means the wattage marked on the lamp or declared as such by the manufacturer or responsible distributor for the lamp.
<i>reference ballast</i>	means special ballast that at its rated frequency it has a stable voltage/current ratio which is relatively uninfluenced by variations in current, temperature and magnetic surroundings.
<i>two-part CFL</i>	means a complete package that consists of a CFL and a lamp holder with an integrated ballast, both of which are manufactured by the same manufacturer, and tested, packaged for supply as a single entity.

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4 Appliance Classification

4.1 CFLs shall be classified into the following two types, namely integrated type and non-integrated type, according to their configurations:

- (a) integrated type with built-in control gear, which is either –
 - (i) a single integrated assembly consisting of lamp, ballast, and lamp base; or
 - (ii) a two-part CFL consisting of lamp(s) and a lamp holder with integrated ballast, both of which are manufactured by the same manufacturer, and tested and packaged for supply as a single entity.
- (b) non-integrated type without built-in control gear, which is a separate lamp electrically connected to a permanently wired external ballast for operation.

5 Test Methodology & Standards

5.1 General

All test standards specified in the Code are only related to checking compliance with the energy efficiency and general performance requirements. It is not the intention of the Code to detail out the test standards and requirements for checking compliance with the Electrical Products (Safety) Regulation of the Government. The supplier shall conduct appropriate tests, where necessary, in addition to those specified in the Code in order to obtain Certificates of Safety Compliance for his appliances.

5.2 Test Standards - Safety Requirements

The testing standards for checking compliance with the safety requirements are based on the following standards or other equivalent international standards approved by the Director. For detailed requirements and procedural descriptions one shall refer to the respective standards.

- (a) IEC 60968, Self-ballasted Lamps for General Lighting Services - Safety Requirements; and
- (b) IEC 61199, Single-capped Fluorescent Lamps - Safety Specifications.

5.3 Test Standards - Technical Performances

5.3.1 The efficacy value (lumens/watt) is the major criterion to determine whether a lamp can meet the specific energy efficiency requirement specified in the Code.

5.3.2 The testing standards for measurement of electrical and photometric performances are based on the following standards or other equivalent international standards approved by the Director. For detailed requirements and procedural descriptions one shall refer to the respective standards.

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- (a) IEC 60969, Self-ballasted Lamps for General Lighting Services - Performance Requirements;
- (b) IEC 60901, Single-capped Fluorescent Lamps - Performance Specifications; and
- (c) CIE 84, The Measurement of Luminous Flux.

5.4 Test Conditions

5.4.1 The tests shall be carried out at a voltage of 380/220V and a frequency of 50Hz with tolerances as specified in the standards mentioned in Section 5.3 of the Code. During testing, the sample size for carrying out all the tests shall be at least 20.

5.4.2 For integrated type CFLs with built-in control gear, the test conditions shall be as follows:

- (a) the selection, seasoning and stabilization of test lamps, and the test conditions shall be as described in Section 2 and Annex A of IEC 60969; and
- (b) test lamps shall be tested in the base-up position.

5.4.3 For non-integrated type CFLs without built-in control gear, the test conditions shall be as follows:

- (a) the selection, seasoning and stabilization of test lamps, and the test conditions shall be as described in Section 1 and Annex B of IEC 60901; and
- (b) test lamps shall be tested either in base-up or horizontal mounted position.

5.5 Measurement of Lumen Output of Test Lamp

For all types of CFLs, lamp lumen output at the test conditions shall be measured in accordance with the requirements of CIE 84.

5.6 Measurement of Electrical Characteristics of Test Lamp

For all types of CFLs, the electrical characteristics measurement and procedures shall be as described in Section 1 and Annex B of IEC 60901 except that the provisions of IEC 60901 which refer to the operation of the lamp using a reference ballast do not apply to the testing of integrated type CFLs with built-in control gear.

5.7 Measurement of Lumen Maintenance and Lamp Life

For all types of CFLs, lumen maintenance and lamp life at the test conditions shall be measured in accordance with Section 2 and Annex A of IEC 60969.

5.8 Determination of Lamp Luminous Efficacy

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Lamp luminous efficacy shall be determined by computing the ratio of the measured lamp lumen output and lamp electrical power input at equilibrium for the test conditions.

6 Energy Efficiency Grading

- 6.1 The mandatory EELS shall adopt the “Grading Type” energy label to determine the degree of energy efficiency for CFLs. The “Grading Type” energy label is divided into 5 grades. A CFL with a Grade 1 label means that it is the most energy efficient product in the market.
- 6.2 The luminous efficacy, average lamp life and lumen maintenance measured and obtained from the tests will be the key factors to classify the energy efficiency grading of CFLs. For grading of any CFL of a type as listed in Table 1 or Table 2, the corresponding minimum allowable luminous efficacy shall be as indicated in the Tables. In addition, for any CFL having Grade 1, 2, 3 or 4 label, the average lamp life shall not be less than 6,000 hours and the lumen maintenance at 2,000 hours shall not be less than 78%. Any CFL product with the average lamp life less than 6,000 hours, and/or the lumen maintenance at 2,000 hours less than 78%, can only obtain Grade 5 label.

**Table 1 - Minimum Allowable Luminous Efficacy
for Integrated Type CFLs with Built-in Control Gear**

Rated Lamp Wattage (L _w)	Minimum Allowable Luminous Efficacy (Lumen/W)				
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	Note (1a)				Note (1b)
≤ 10W	≥ 49.5	49.5 > X ≥ 45.0	45.0 > X ≥ 40.5	< 40.5	N/A
11-20W	≥ 55.0	55.0 > X ≥ 50.0	50.0 > X ≥ 45.0	< 45.0	N/A
21-30W	≥ 60.5	60.5 > X ≥ 55.0	55.0 > X ≥ 49.5	< 49.5	N/A
≥ 31W	≥ 66.0	66.0 > X ≥ 60.0	60.0 > X ≥ 54.0	< 54.0	N/A

Note:

- (1a) Average lamp life not less than 6,000 hours and lumen maintenance at 2,000 hours not less than 78%
- (1b) Average lamp life less than 6,000 hours and/or lumen maintenance at 2,000 hours less than 78%

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**Table 2 - Minimum Allowable Luminous Efficacy
for Non-integrated Type CFLs without Built-in Control Gear**

Rated Lamp Wattage (L_w)	Minimum Allowable Luminous Efficacy (Lumen/W)				
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	Note (2a)				Note (2b)
$\leq 10W$	≥ 55.0	$55.0 > X \geq 50.0$	$50.0 > X \geq 45.0$	< 45.0	N/A
11-30W	≥ 71.5	$71.5 > X \geq 65.0$	$65.0 > X \geq 58.5$	< 58.5	N/A
$\geq 31W$	≥ 82.5	$82.5 > X \geq 75.0$	$75.0 > X \geq 67.5$	< 67.5	N/A

Note:

(2a) Average lamp life not less than 6,000 hours and lumen maintenance at 2,000 hours not less than 78%

(2b) Average lamp life less than 6,000 hours and/or lumen maintenance at 2,000 hours less than 78%

6.3 The aforesaid lamp luminous efficacy refers to values (both lumen output and electrical power input) measured at the end of the 100-hour ageing period.

6.4 Unless otherwise indicated, the requirements set forth in the Code shall apply to non-dimmable CFLs, and also to multi-level and/or dimmable CFLs that are operating at maximum power.

6.5 The luminous efficacy for an integrated type CFL with built-in control gear includes the lamp control gear loss.

6.6 The luminous efficacy for a non-integrated type CFL without built-in control gear excludes the lamp control gear loss.

7 Performance Requirements

7.1 The CFL shall be tested for conformity with the following performance requirements in accordance with the relevant clauses of CIE 84, IEC 60901 and IEC 60969 or other equivalent international standards approved by the Director:

(a) The measured energy consumption at the end of 100-hour ageing period shall not exceed 115% of the rated energy consumption.

(b) The measured lumen output (luminous flux) at the end of 100-hour ageing period shall be not less than 90% of the rated lumen output (luminous flux).

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- (c) The measured life to 50% failures (average life) shall not be less than the rated life to 50% failures (rated average life)
- (d) The measured lumen maintenance shall not be less than the rated lumen maintenance.

7.2 In addition to the specific energy efficiency requirements, all CFLs shall comply with the Electrical Products (Safety) Regulation, and all other legislations concerning the safety of the CFLs.

8 Design and Format of Energy Label

8.1 The energy label for CFL is shown in Appendix 3. After successful application for registration, the applicant (now the registration holder) shall print the energy label for his / her registered product model showing the agreed energy efficiency grade and associated information in strict accordance with the requirements as shown in Appendix 3.

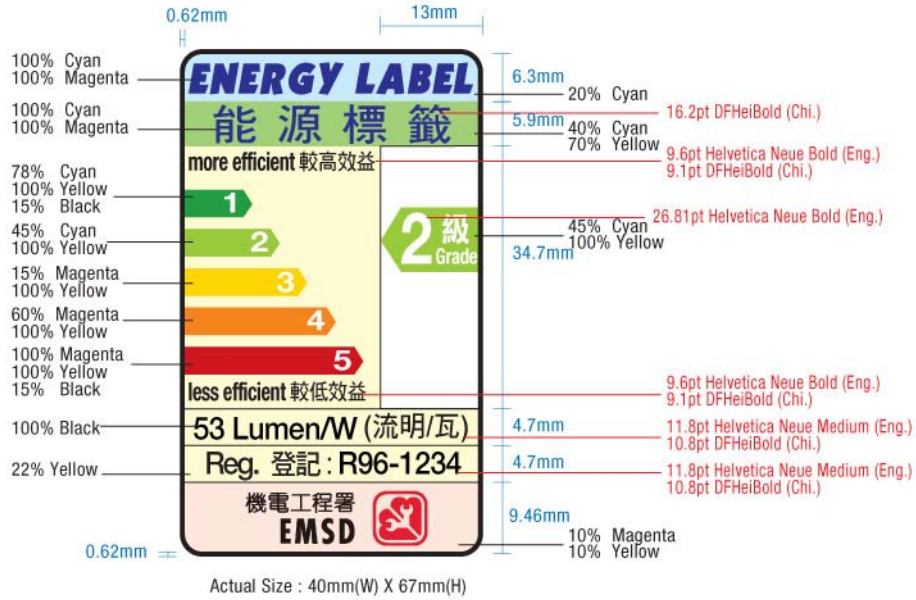
9 Manner of Labelling

9.1 The energy label shall be printed or affixed on product packaging at a prominent location.

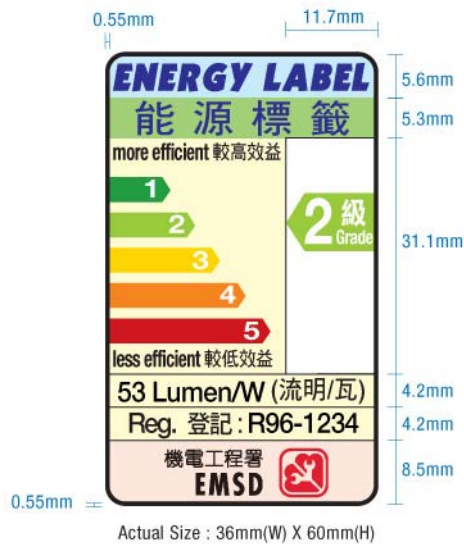
9.2 The energy label as shown in Appendix 3 shall be appropriately chosen according to the following criteria:

- (a) The largest energy label shall first be chosen and checked on its compliance with all the requirements in this clause. If all the requirements in this clause cannot be met, then the second largest energy label shall be chosen. This selection process shall be iteratively carried out until an appropriate energy label is chosen.
- (b) The energy label shall be contained in a blank border of at least 5mm and shall not cover more than 50% of the surface area of the largest side of the product packaging.
- (c) In case that the packaging is too small to take the smallest energy label in Appendix 3, the registration holder shall apply for the Director's approval for a special method on attaching the energy label to the product packaging.

Energy Label Design and Format



100%



90%

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Appendix 1 (Cont'd)

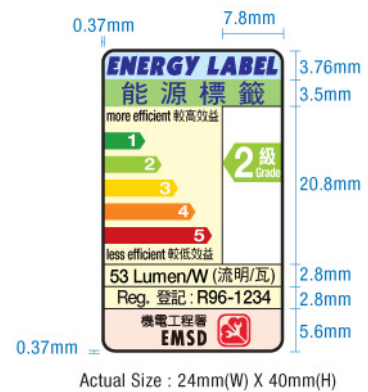
Energy Label Design and Format



80%



70%



60%