# Energy Efficiency (Labelling of Products) Bill

## The Administration's Response to the questions raised at the Bills Committee meeting on 12 July 2007

(1) Revise clause 40 to include the requirement for consultation with stakeholders in the preparation of codes of practice having regard to similar provision in other existing ordinances, including the Securities and Futures Ordinance (Cap. 571) and Companies Ordinance (Cap. 32)

In light of the Bills Committee's suggestion, we are preparing amendments to clause 40 to include the requirement that the relevant authority should consult stakeholders in the course of preparing codes of practice. Reference is being made to similar provisions under other ordinances.

(2) Provide the draft codes of practice for members' reference

The draft code of practice is appended at Annex A.

(3) Consider excluding compact fluorescent lamps that were supplied as part of or in connection with the disposition of specified premises from the application of the Bill

Under the Bill, energy labels for compact fluorescent lamps should be affixed to their packaging. In light of the comments of some Bills Committee members that it would be difficult for compact fluorescent lamps supplied in specified premises to meet the requirement, we propose to amend the Bill to exclude compact fluorescent lamps supplied in the above-mentioned situation from the relevant requirement.

(4) Review the use of words for the English and Chinese versions of the definition of "specified premises" under clause 2

The Bills Committee requested the Department of Justice to review the Chinese and English wording of the definition of "specified premises". The wording is as follow –

"specified premises" means newly completed premises, whether

domestic or not –

(a) subject to paragraph (b), the first disposition of which has not been made; or

(b) if the first occupation of which is made before the first disposition, the first occupation of which has not been made.

「指明處所」指任何新落成的不論是否住宅的處所，而 —

(a) (除(b)段另有規定外)該處所的首次處置是尚未作出的; 或

(b) (如該處所的首次佔用是在其首次處置之前進行的)該處所的首次佔用是尚未進行的。

After further consideration, the Department of Justice is of the view that the wording in the above definitions reflect our policy intent and the meaning presented in both the Chinese and English texts is consistent and in accordance with the rule of grammar for both languages. Hence, no amendments are considered necessary.

(5) Advise whether it was a common practice in law to provide for "approved code of practice" and the existing ordinances which had similar provision

The use of “approved code of practice” is common in Hong Kong laws and there are a number of precedents. Provisions that provide for “approved code of practice” include section 29(1) of the 《Unsolicited Electronic Messages Ordinance》 (Cap. 593), section 8(1) of the 《Merchant Shipping (Local Vessels) Ordinance》(Cap. 548), section 12(1) of the《Personal Data (Privacy) Ordinance》 (Cap. 486) and section 10(1) of the 《Social Workers Registration Ordinance》(Cap. 505).

**Environment Bureau**
**September 2007**

Annex A

DRAFT

# Code of Practice

# on

# Energy Efficiency Labelling of Products

(August 2007 Edition)

Electrical and Mechanical Services Department

The Government of Hong Kong Special Administrative Region

EMSD

DRAFT

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## 1. Introduction

1.1. This Code of Practice on Energy Efficiency Labelling of Products is approved and issued under section 40 of the Energy Efficiency (Labelling of Products) Ordinance (cited as the "Ordinance") and is hereinafter referred to as the "Code".

1.2. The Code sets out the practical guidance and technical details in respect of the requirements on energy efficiency labelling for room air conditioners, refrigerating appliances and compact fluorescent lamps under the Ordinance.

1.3. The Electrical and Mechanical Services Department of the Government of the Hong Kong Special Administrative Region (HKSAR) thanks:

(a) the International Organization for Standardization (ISO) for permission to reproduce information from its International Standard ISO 5151:1995, ISO 5155:1995, ISO 7371:1995, ISO 8187:1991, ISO 8561:1995 and ISO 15502:2005, which can be obtained from the ISO website, www.iso.org, or from an ISO member. Copyright remains with ISO.

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(c) the International Commission on Illumination (CIE) for giving authorization to quote CIE 84—1989 as reference. The complete CIE publication can be ordered from the CIE website www.cie.co.at.

## 2. Interpretation of Terms

This clause provides definitions of terms used in the Code. Unless otherwise specified, the definitions adopted in the Code follow those stipulated in the Ordinance, if any.

*Director* means the Director of Electrical and Mechanical Services.

| | |
|---|---|
| *disposition* | in relation to any specified premises, includes a sale of, a lease of, and a licence and permission to occupy the specified premises. |
| *family of models* | means a range of models of a prescribed product where in each model— (a) the physical characteristics that affect the energy efficiency are the same; and (b) the output, energy consumption, energy efficiency and performance characteristics are the same. |
| *listed model* | in relation to a product model, means a model the reference number of which is included in the record kept under section 13 of the Ordinance. |
| *mains electricity* | means the electricity that is supplied in Hong Kong at a voltage of 380/220V and a frequency of 50 Hz. |
| *prescribed product* | means a product specified in Part 1 of Schedule 1 of the Ordinance (that is, the products specified in clauses 6.1, 7.1 and 8.1 of the Code). |
| *reference number* | means a number assigned to a product model by the Director under section 8 of the Ordinance. |
| *second-hand product* | means a prescribed product that has previously been used by a consumer. |
| *specified document* | means a document within the meaning of section 6 of the Ordinance. |
| *specified information* | means the information within the meaning of section 6 of the Ordinance. |
| *specified person* | in relation to a product model, means a person who has submitted the specified information in respect of the model under section 6 of the Ordinance. |

*specified premises* means newly completed premises, whether domestic or not—

(a) subject to paragraph (b), the first disposition of which has not been made; or

(b) if the first occupation of which is made before the first disposition, the first occupation of which has not been made.

*supply* in relation to the supply of a prescribed product, means—

(a) to sell or hire out the prescribed product;

(b) to offer, keep or exhibit the prescribed product or any part of the product for sale or for hiring out;

(c) to exchange or dispose of the prescribed product for consideration;

(d) to transmit, convey or deliver the prescribed product in pursuance of—

(i) a sale;

(ii) a hiring out; or

(iii) an exchange or disposal for consideration; or

(e) for commercial purposes, to give the prescribed product as a prize or to make a gift of such a product.

## 3. Application

3.1. Subject to clause 3.2 of the Code, this Code applies to a prescribed product that is supplied in Hong Kong, including a prescribed product supplied as part of or in connection with the disposition of any specified premises.

3.2. This Code does not apply to a prescribed product that is—

(a) under trans-shipment or in transit through Hong Kong;

(b) manufactured in Hong Kong for export;

(c) supplied as scrap;

(d) supplied in a place other than Hong Kong under a sale agreement which is entered into in Hong Kong;

(e) a second-hand product; or

(f) supplied as part of or in connection with the disposition of any premises other than specified premises.

## 4. Requirements on Testing Laboratory

4.1. When a specified person submits the specified information and specified document under section 6 of the Ordinance, the Director will accept the test reports issued by a test laboratory which meets any one of the following criteria:

(a) The laboratory is accredited—

(i) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) operated by the Hong Kong Accreditation Service (HKAS) for the relevant test; or

(ii) under an accreditation scheme operated by a laboratory accreditation body in other economies with which HKAS has concluded a mutual recognition agreement / arrangement (MRA) for the relevant test.

(b) The laboratory has been assessed and evaluated by a recognized independent certification body, and is certified by the certification body to be competent for carrying out the relevant test.

(c) The laboratory has been assessed and recognized by the Director under the voluntary Energy Efficiency Labelling Scheme for conducting the relevant test, and is certified under ISO 9001 or equivalent standards for quality system.

4.2. The recognised independent certification body mentioned in clause 4.1(b) shall meet the following minimum requirements—

(a) Being recognized internationally to be competent for certifying product energy efficiency performance tests;

(b) Having experience in assessing and certifying the relevant energy efficiency performance tests; and

(c) Having well established assessment procedures, including staff training and assessment criteria, relating to assessment and certification of energy efficiency

performance tests.

4.3. When the specified information and specified document are submitted under section 6 of the Ordinance, necessary supporting documents shall be submitted to prove that the testing laboratory and/or the independent certification body concerned meet the requirements in clauses 4.1 and 4.2.

## 5. Requirements on Test Report

5.1. The test report to be submitted under section 6 of the Ordinance shall be issued by a testing laboratory which satisfies the requirements as stipulated in clause 4 of the Code.

5.2. The test report shall contain at least the following information—

(a) the name, address and particulars of the institution that carried out the test;

(b) the date of the test and the report;

(c) the name and designation of the test supervisor;

(d) the test objective;

(e) the testing standards adopted;

(f) the information given on the nameplate of the product;

(g) a description of the tests carried out, the test requirements and procedures as specified in the Code;

(h) the energy efficiency and performance characteristics of the product model as measured by the tests;

(i) the test data and results showing that the product model being tested conforms with the relevant standard; and

(j) other results of the test.

5.3. The test shall be carried out to the standards as specified in the Code for the product type concerned.

5.4. The test report shall be endorsed and signed by the test supervisor of the test institution.

5.5 The test report submitted in connection with the submission of specified information and specified documents shall be either the original copy or a certified true copy.

## 6. Energy Efficiency Labelling for Room Air Conditioners

6.1. Scope

6.1.1. Clause 6 of the Code, unless the Director provides otherwise, applies to a room air conditioner defined in the Ordinance, that is, the products specified in clauses 6.1.2 and 6.1.3.

6.1.2. "Room air conditioner", subject to clause 6.1.3 of the Code—

(a) means an encased assembly or encased assemblies that are designed to be used together where—

(i) the assembly or assemblies is or are designed primarily to provide free delivery of conditioned air to an enclosed space, room or zone ("conditioned space"); and

(ii) the assembly or assemblies has or have a prime source of refrigeration for cooling or heating; and

(b) includes single package type and split type room air conditioners that—

(i) use mains electricity as the primary power source;

(ii) operate by using the vapour compression cycle;

(iii) are non-ducted;

(iv) are air-cooled;

(v) are of either cooling only type or reverse cycle type; and

(vi) have a rated cooling capacity not exceeding 7.5 kilowatts.

6.1.3. "Room air conditioner" does not include air-conditioners that are—

(a) fan-coil air-conditioning units;

(b) water-cooled units;

(c) multiple split-system air conditioners;

(d) heat pumps for heating only;

(e) units designed for use with additional ducting or flexible pipes for air intake or exhaust; or

(f) ceiling-mounted type or floor standing type air conditioners.

6.2. Definitions

This clause provides definitions of terms used in clause 6 of the Code. Unless otherwise specified, the definitions adopted in the clause 6 follow those stipulated in the Ordinance, if any.

*air-cooled* — in relation to a room air conditioner, means the employment of air-cooled condensers in the room air conditioner.

*ceiling-mounted type air conditioner* — means a split type room air conditioner whose indoor unit—

(a) is equipped with mounting brackets or hooks on its body at appropriate locations;

(b) is intended to be installed with mounting rods or mounting bolts fastened on the ceiling in accordance with the manufacturer's installation procedures;

(c) is intended to be installed directly under the ceiling; and

(d) has an intake grille, which may or may not be installed at the same level as the adjacent false ceiling panels (if there are such false ceiling panels).

*cooling capacity* — means the amount of sensible and latent heat that a room air conditioner can remove from the conditioned space in a defined interval of time.

*cooling only type* — means a room air conditioner which is used for cooling, but not for heating.

*effective power input ($P_E$ )* — means the average electrical power input to the room air conditioner within a defined interval of time, obtained from—

(a) the power input for operation of the compressor and any power input for defrosting, excluding additional electrical heating devices not used for

defrosting;

(b) the power input of all control and safety devices of the room air conditioner; and

(c) the power input of the conveying devices within the room air conditioner for heating transport media (e.g. fan, pump).

*fan-coil air-conditioning unit* means an air-conditioning unit equipped with a fan re-circulating air from the conditioned space through the coil, that contains either chilled or hot water for cooling or heating.

*floor standing type air conditioner* means a split type room air conditioner whose indoor unit is intended to be installed directly on the floor in accordance with the manufacturer's installation procedures.

*heat pump* means an encased assembly or assemblies designed as a unit to provide delivery of heat, which includes an electrically operated refrigeration system for heating.

*ISO* means International Organisation for Standardisation (the latest edition of the standard shall be followed for test methodology).

*multiple split-system* means a split system that—

(a) incorporates a single or multiple refrigerant circuits;

(b) has one or more compressors;

(c) has multiple indoor units;

(d) has one or more outdoor units; and

(e) is capable of operating either as an air conditioner or a heat pump.

*non-ducted* means not having any additional ductings or pipes required for air intake and exhaust.

| | |
|---|---|
| *rated cooling capacity* | means the cooling capacity of a room air conditioner as determined and declared by the manufacturer or importer of the room air conditioner in accordance with the standard and requirements specified in the Code. |
| *rated power consumption* | means the power input of a room air conditioner as determined and declared by the manufacturer or importer of the room air conditioner in accordance with the standard and requirements specified in the Code. |
| *refrigeration circuit* | means a physical circuit through which a refrigerant is compressed and liquefied, allowed to cool in a condenser, and then allowed to expand to become a gas in an evaporator (the expansion is accompanied by a strong cooling effect). In this operation the condenser becomes warm and the evaporator becomes cold as the heat is removed from the evaporator to the condenser. |
| *reverse cycle type* | means a room air conditioner which can operate in normal or reverse vapour compression cycle, used for both cooling and heating. |
| *single package type* | means a room air conditioner which is assembled in factory and consists of components of a refrigeration system fixed on a common mounting to form a discrete unit. |
| *split type* | means a room air conditioner which has separate indoor and outdoor components that are connected with the refrigerant piping, and the indoor unit of which usually lies within the conditioned space. |
| *water-cooled* | in relation to a room air conditioner, means the employment of water-cooled condensers in the room air conditioner. |
| *vapour compression cycle* | means a mechanism employed by a room air conditioner throughout which the refrigerant undergoes alternate compression and expansion to achieve the cooling or heating function. |

6.3. Classification of Room Air Conditioners

All room air conditioners regulated under the Ordinance are categorized in accordance with Table 6.1—

**Table 6.1 – Overall classifications**

| Type | Function | Category | Description |
|---|---|---|---|
| Single Package | Cooling Only | Category 1 | A single package type room air conditioner with cooling function only |
| | Reverse Cycle | Category 2 | A single package type room air conditioner with both cooling and heating functions |
| Split | Cooling Only | Category 3 | A split type room air conditioner with cooling function only |
| | Reverse Cycle | Category 4 | A split type room air conditioner with both cooling and heating functions |

6.4. Tests Required to be Carried Out

The tests specified in this clause are required to be carried out, in accordance with ISO 5151 or other equivalent international standards approved by the Director, in order to find out the energy efficiency and performance characteristics of a room air conditioner. A test report required to be submitted to the Director under section 6 of the Ordinance shall contain the results of these tests:

(a) Cooling capacity test for measuring cooling capacity and corresponding power consumption for both cooling only type and reverse cycle type.

(b) Maximum cooling test for both cooling only type and reverse cycle type.

6.5. Test Methodology and Energy Efficiency Grading for Cooling Capacity

6.5.1. Test Conditions for the Determination of Cooling Capacity

With respect to the measurement of cooling performance of a room air conditioner, the requirements of ISO 5151 standard test condition ‘T1’ for moderate climate as shown in Table 6.2 shall apply.

**Table 6.2 – Test condition for the determination of cooling capacity**

| Parameter | Standard test condition |
|---|---|
| Moderate climate | T1 |
| Temperature of air entering indoor side | |
| dry-bulb | 27 °C |
| wet-bulb | 19 °C |
| Temperature of air entering outdoor side | |
| dry-bulb | 35 °C |
| wet-bulb | 24 °C |

6.5.2. Measurement of Cooling Capacity

The test conditions and the testing methodology for measurement of cooling capacity and power consumption shall follow ISO 5151 or other equivalent international standards approved by the Director. The room air conditioner shall be tested at a voltage of 380/220V and a frequency of 50Hz with tolerances as specified in the standard.

In cases of room air conditioners that have variable output compressors, the output shall be fixed at 100% of rated cooling capacity under the cooling capacity test. The method of fixing the output shall be clearly indicated in the test report.

6.5.3. Calculation of Cooling Capacity ($\Phi_c$)

The cooling capacity ($\Phi_c$) of the room air conditioner shall be calculated based on the mean of the measured values taken over the test period from the cooling capacity test in accordance with the test requirements and the method of calculation in ISO 5151 or other equivalent international standards approved by the Director. The value shall be in watts (W), or in kilowatts (kW).

6.5.4. Measurement of Power Consumption

The power consumption of the room air conditioner shall be measured during the cooling capacity test as described in ISO 5151 or other equivalent international standards approved by the Director. This is the effective power input ($P_E$) to the room air conditioner taken over the test period from the cooling capacity test, in watts (W), or in kilowatts (kW).

In cases of room air conditioners that have variable output compressors, the power consumption shall be measured correspondingly when the output is fixed at 100% of rated cooling capacity under the cooling capacity test stated in clause 6.5.2 of the Code.

6.5.5. Average Appliance Energy Consumption

The Average Appliance Energy Consumption ($E_{av}$) figures are obtained using statistical method by plotting of the power consumption against cooling capacity for a particular room air conditioner category, under the prevailing market situation. They are approximated by a linear equation representing the average energy consumption with respect to the cooling capacity of room air conditioners on sale in the market. The Average Appliance Energy Consumption line equations so developed for room air conditioners in Hong Kong are shown in Table 6.3.

**Table 6.3 – Average appliance energy consumption**

| **Room Air Conditioner Category** | **Average Appliance Energy Consumption (kW)** | **Equation No.** |
|---|---|---|
| Category 1 & 2 | $E_{av} = 0.442 \times \Phi_c$ | 1 |
| Category 3 & 4 | $E_{av} = 0.387 \times \Phi_c$ | 2 |

*Where $\Phi_c$ is the measured cooling capacity defined in clause 6.5.3 of the Code.*
*$E_{av}$ is the average appliance energy consumption expressed in kW.*

6.5.6. Energy Efficiency Grading for Cooling Capacity

(a) Energy Consumption Index ($I_\varepsilon$)

The energy consumption index ($I_\varepsilon$) of a room air conditioner is defined as the ratio of the actual effective power input ($P_E$) of the room air conditioner to the Average Appliance Energy Consumption ($E_{av}$) (as found from the associated average energy consumption line in clause 6.5.5 of the Code) of room air conditioners with same cooling capacity and same room air conditioner category. The index is expressed in percentage. Thus, by comparing the energy consumption indices, all room air conditioners can have a meaningful comparison of their energy efficiencies. Within a category, a room air conditioner with a lower energy consumption index (i.e. a lower percentage) consumes less energy than a room air conditioner with a higher energy consumption index (i.e. a higher percentage). The energy consumption index

is calculated as follows—

$$\text{Energy Consumption Index } (I_\varepsilon) = \frac{P_E}{E_{av}} \text{ x100\% .....(eq. 3)}$$

*Where $P_E$ = effective power input (actual power consumption) of the room air conditioner measured in cooling capacity test.*

*$E_{av}$ = Average Appliance Energy Consumption as determined from Table 6.3.*

(b) Energy Efficiency Grading

The energy efficiency grade of the room air conditioner shall be determined as shown in Table 6.4, with Grade 1 having the best performance and Grade 5 having the worst performance.

**Table 6.4 – Derivation of energy efficiency grades**

| **Energy Consumption Index $I_\varepsilon$ (%)** | **Energy Efficiency Grade** *(Note 1,2)* |
|---|---|
| $I_\varepsilon \leq 85$ | 1 |
| $85 < I_\varepsilon \leq 95$ | 2 |
| $95 < I_\varepsilon \leq 105$ | 3 |
| $105 < I_\varepsilon \leq 120$ | 4 |
| $120 < I_\varepsilon$ | 5 |

*Note:*

*1 In order to obtain Grade 1 to 4, the room air conditioner concerned shall also pass the maximum cooling test. Only Grade 5 will be accorded if the room air conditioner does not pass the maximum cooling test or $I_\varepsilon > 120$.*

*2 A specified person shall note and ensure that the actual energy efficiency performance of all his/her room air conditioners of the same model supplied in the market shall fall in the energy efficiency grade which is the same as or better than that submitted to the Director. In this connection, the specified person shall take due consideration of the variation of energy efficiency performance of the room air conditioners to be supplied in the market, and specify the lowest*

*possible energy efficiency grade in the specified information of the concerned model submitted to the Director, notwithstanding that the particular test report submitted may reflect a higher energy efficiency grade.*

An example illustrating the method on how to determine the energy efficiency grade of a room air conditioner is shown in Appendix 1A.

6.6. Performance Requirements

6.6.1 The results of the tests carried out in accordance with the relevant clauses of ISO 5151 or other equivalent international standards approved by the Director shall show that the concerned model conforms with the following performance requirements—

(a) The measured cooling capacity for both cooling only type and reverse cycle type room air conditioners shall not be less than 95% of the rated cooling capacity of the room air conditioner.

(b) The measured power consumption shall not be greater than 110% of the rated power consumption of the room air conditioner.

(c) The room air conditioner shall pass the maximum cooling test. Any room air conditioner failing the maximum cooling test can only obtain Grade 5 for its cooling function.

6.6.2 The rated cooling capacity and the rated power consumption as declared by the manufacturer or importer shall meet the requirements specified in clause 6.6.1 of the Code.

6.7. Safety Requirements

In addition to the energy efficiency performance requirements, all room air conditioners shall comply with the Electrical Products (Safety) Regulation of the HKSAR and the safety standards specified under the Regulation, and all other legislations concerning the safety of the room air conditioners, e.g. the Gas Safety Ordinance and its subsidiary legislations, as appropriate.

6.8. Number of Samples to be Tested

6.8.1. For submission of product information of a model under section 6 of the Ordinance, subject to clause 6.8.2 of the Code, a test report on one sample of the model shall be submitted.

6.8.2. However, if the test results of one sample indicate that the measured cooling capacity is equal to or greater than 95%, and is less than 97.5% of the rated cooling capacity, and the measured power consumption is greater than 106%, and is equal to or less than 110% of the rated power consumption, the test report shall include the tests of two samples of the same model. In such case, each individual sample shall meet all the performance requirements in clause 6.6 of the Code. Also, the information on the energy label shall be based on the test results of the tested sample with a higher energy consumption index ($I_\varepsilon$).

6.9. Energy Label

6.9.1 The specification of the energy label for room air conditioner is shown in Appendix 1B. After a reference number has been assigned to a product model in the name of a specified person and included in the Director's record, the specified person shall produce the energy label for his/her products of the listed model showing the energy efficiency grade and associated information in accordance with the requirements in Appendix 1B.

6.9.2 The energy label is to be—

(a) attached or affixed –

(i) to a prominent position of the room air conditioner; or

(ii) if only part of the room air conditioner is being exhibited, to a prominent position of that part of the room air conditioner;

and is to be clearly visible; or

(b) attached to the room air conditioner or its packaging in a manner approved by the Director.

6.9.3 The energy label shall be of cardboard, if it is to be attached as a swing tag, or be self-adhesive and shall be cut to the outline shown in Appendix 1B. A trim or die cut margin of up to 2 mm around the energy label is acceptable.

6.9.4 The paper used for the energy label shall be durable with good wear and tear characteristics.

## 7. Energy Efficiency Labelling for Refrigerating Appliances

7.1. Scope

7.1.1. Clause 7 of the Code, unless the Director provides otherwise, applies to a refrigerating appliance defined in the Ordinance, that is, the products specified in clauses 7.1.2 and 7.1.3.

7.1.2. "Refrigerating Appliance", subject to clause 7.1.3 of the Code—

(a) means a factory-assembled insulated cabinet with one or more compartments and of suitable volume and equipment for household use, cooled by internal natural convection or a frost-free system where the cooling is obtained by one or more energy-consuming means;

(b) includes a refrigerator, frozen food storage cabinet, food freezer, and their combinations; and

(c) includes refrigerating appliances that—

(i) use mains electricity as the primary power source;

(ii) operate by using the vapour compression cycle; and

(iii) have a rated total storage volume not exceeding 500 litres.

7.1.3. "Refrigerating Appliance" does not include refrigerating appliances which—

(a) may also use other energy sources; or

(b) operate by using absorption refrigerating system.

7.2. Definitions

This clause provides definitions of terms used in clause 7 of the Code. Unless otherwise specified, the definitions adopted in the clause 7 follow those stipulated in the Ordinance, if any.

| | |
|---|---|
| *absorption refrigerating system* | means a system— (a) by which refrigeration effect is produced through the use of two fluids and some quantity of heat input; and (b) in which a secondary fluid or absorbent, rather than a mechanical compressor, is used to circulate the refrigerant. |

| | |
|---|---|
| *adjusted volume* | means the volume for the storage of foodstuff corrected for the relative contribution to the total energy consumption according to the different temperatures of the storage compartments. |
| *cellar compartment* | means a compartment intended for the storage of particular foods or beverages at a temperature warmer than that of the fresh food storage compartment. |
| *chill compartment* | means a compartment intended specifically for the storage of highly perishable foodstuffs whose volume is capable of containing at least 2 “M” packages. |
| *food freezer* | means a refrigerating appliance having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of –18 ºC and which is also suitable for the storage of frozen food under three-star storage conditions. |
| *food freezer compartment* | means a compartment suitable for freezing foodstuffs from ambient temperature down to –18 ºC, and which is also suitable for the storage of frozen food under three-star storage conditions. |
| *fresh food storage compartment* | means a compartment intended for the storage of unfrozen food, which may itself be divided into sub-compartments. |
| *frozen food storage cabinet* | means a refrigerating appliance having one or more compartments suitable for the storage of frozen food. |
| *frozen food storage compartment* | means a low-temperature compartment intended specifically for the storage of frozen food. Frozen food storage compartments are classified according to temperature as shown in clause 7.3 of the Code. |
| *ice-making compartment* | means a compartment intended specifically for the freezing and storage of water ice-cubes. |
| *ISO* | means International Organization for Standardization (the latest edition of the standard shall be followed for test methodology) |

| | |
|---|---|
| *low temperature compartment* | means a compartment which may be either an ice-making compartment or a frozen food storage compartment. |
| *rated energy consumption* | means the energy consumption of a refrigerating appliance as determined and declared by the manufacturer or importer of the refrigerating appliance in accordance with the standard and requirements specified in the Code. |
| *rated freezing capacity* | means the freezing capacity of a refrigerating appliance as determined and declared by the manufacturer or importer of the refrigerating appliance in accordance with the standard and requirements specified in the Code. |
| *rated storage volume* | means the storage volume of a refrigerating appliance as determined and declared by the manufacturer or importer of the refrigerating appliance in accordance with the standard and requirements specified in the Code. |
| *rated total storage volume* | means the total storage volume of a refrigerating appliance as determined and declared by the manufacturer or importer of the refrigerating appliance in accordance with the standard and requirements specified in the Code. |
| *refrigerator* | means a refrigerating appliance intended for the preservation of food, one of whose compartments is suitable for the storage of fresh food. |
| *refrigerator / freezer* | means a refrigerating appliance having at least one compartment suitable for the storage of fresh food (the fresh food storage compartment) and at least one other (the food freezer compartment) suitable for the freezing of fresh food and the storage of frozen food under three-star storage conditions. |
| *storage volume* | means that part of the total volume of any compartment which remains after deduction of the volume of components and spaces recognized as unusable for the storage of food, determined in accordance with the standard. |

| | |
|---|---|
| *total storage volume* | means the sum of the storage volumes of the refrigerating appliance, comprising the storage volumes of the fresh food storage compartment(s), low temperature compartment(s), food freezer compartment [including any "two star" section(s) and/or compartment(s) contained therein], and cellar compartment(s). |
| *vapour compression cycle* | means a mechanism employed by a refrigerating appliance throughout which the refrigerant undergoes alternate compression and expansion to achieve the cooling function. |
| *"1-star" compartment* | means a frozen food storage compartment in which the storage temperature measured as described in clause 7.3 of the Code, is not warmer than –6 $^{o}$C. |
| *"2-star" compartment* | means a frozen food storage compartment in which the storage temperature measured as described in clause 7.3 of the Code, is not warmer than –12 $^{o}$C. |
| *"3-star" compartment* | means a frozen food storage compartment in which the storage temperature measured as described in clause 7.3 of the Code, is not warmer than –18 $^{o}$C. |
| *"4-star" freezer* | means a three-star compartment with the added capability of freezing a certain amount of foodstuff which is no less than 4.5 kg per 100 litres, with a minimum of 2.0 kg within 24 hours. |

7.3. Classification of Refrigerating Appliances

7.3.1 Basic Classification

Refrigerating appliances which are regulated under the Ordinance are classified as below—

(a) Climate Class

The classification used in the Code follows the requirements of subtropical climate class 'ST' of the following standards as shown in Table 7.1—

(i) ISO 5155, ISO 7371, ISO 8187 and ISO 8561 standards; or

(ii) ISO 15502 standard.

Therefore all the tests required according to the Code shall be carried out under the conditions of measured ambient temperature for climate class 'ST" stipulated in the above standards.

**Table 7.1 – Climate class**

| **Class** | **Symbol** | **Ambient temperature range (°C)**[(Note)] | |
|---|---|---|---|
| | | **ISO 5155, 7371, 8187 and 8561** | **ISO 15502** |
| Subtropical | ST | +18 to +38 | +16 to +38 |

*Note: The importer or manufacturer shall clearly indicate which test standard(s) they follow in testing their refrigerating appliances*

(b) Frozen Food Compartment(s)

The refrigerating appliance shall be classified according to its capability to freeze food, i.e. the performance of its frozen food compartment. 'Star' rating system shall be used to distinguish the operating temperature of individual storage compartment under loaded conditions. The storage temperature requirements stipulated in the standards are denoted as follows—

(i) ISO 5155, ISO 7371, ISO 8187 and ISO 8561 standards

If these standards are used to test the refrigerating appliance, Tables 7.2A and 7.2B shall be followed.

(ii) ISO 15502 standard

If this standard is used to test the refrigerating appliance, Table 7.2C shall be followed.

**Table 7.2A – Storage compartment temperature**

Applicable to refrigerating appliances other than those cooled by internal forced air circulation

Values in ºC

| Fresh food storage compartment | | "1-star" compartment | "2-star" compartment | "3-star" compartment | "4-star" freezer compartment |
|---|---|---|---|---|---|
| $t_1$, $t_2$, $t_3$ | $t_{m, max}$ | t* | t** | t*** | t**** |
| $0 < t_1, t_2, t_3 \leq +10$ | +5 | $\leq -6$ | $\leq -12$ | $\leq -18$ | $\leq -18$<br>with added freezing capacity [see 7.3.1(c)] |

**Table 7.2B – Storage compartment temperature**

Applicable to refrigerating appliances cooled by internal forced air circulation

Values in ºC

| | Fresh food storage compartment | | Frozen food storage or food freezer compartment, cabinet or section, as applicable | | | Cellar compartment | Chill compartment |
|---|---|---|---|---|---|---|---|
| | $t_1$, $t_2$, $t_3$ | $t_{m, max}$ | t* | t** | t*** | $t_{cm, max}$ | $t_{cc\ max, min}$ |
| Storage temperatures | $0 < t_1, t_2, t_3 \leq +10$ | +5 | $\leq -6$ | $\leq -12$ | $\leq -18$ | $+8 \leq t_{cm, max} \leq +14$ | $-2 \leq t_{cc\ min}$, $t_{cc\ max} \leq +3$ |
| Permitted deviations during defrost cycle | $0 < t_1, t_2, t_3 \leq +10$ | +7 | $\leq -6$ | $\leq -12$ | $\leq -15$ | $+8 \leq t_{cm, max} \leq +14$ | $-2 \leq t_{cc\ min}$, $t_{cc\ max} \leq +3$ |

**Table 7.2C – Storage compartment temperature**

Values in ºC

| | Fresh food storage compartment | | "1-star" compartment | "2-star" compartment / section | Food freezer & "3-star" compartment / cabinet | Cellar compartment | Chill compartment |
|---|---|---|---|---|---|---|---|
| | $t_{1m}$, $t_{2m}$, $t_{3m}$ | $t_{ma}$ | t* | t** | t*** | $t_{cm}$ | $t_{cc}$ |
| Storage temperatures | $0 < t_{1m}, t_{2m}, t_{3m} \leq +8$ | $\leq +4$ | $\leq -6$ | $\leq -12$ | $\leq -18$ | $+8 \leq t_{cm} \leq +14$ | $-2 \leq t_{cc} \leq +3$ |
| Permitted deviations during defrost cycle | $0 < t_{1m}, t_{2m}, t_{3m} \leq +8$ | $\leq +4$ | $\leq -6$ | $\leq -9$ | $\leq -15$ | $+8 \leq t_{cm} \leq +14$ | $-2 \leq t_{cc} \leq +3$ |

*Note: $t_1$, $t_2$, $t_3$, denote the temperatures at 3 sensing points spaced along the height of the fresh food storage compartment. $t_m$ is their arithmetic mean. t*,t**,t***,t**** denote the mean temperatures of frozen food storage compartments respectively.*

(c) Freezing Capacity

A compartment, which meets the requirement of a "3-Star" compartment and has an added capability of freezing a certain amount of foodstuff (not less than 4.5 kg/100 litres volume, with a minimum of 2.0 kg) to –18 °C in 24 hours, is defined as a "4-Star" compartment.

7.3.2 Overall Classification

All refrigerating appliances shall be classified in accordance with Table 7.3, which also incorporates the various parameters involved in the classification—

**Table 7.3 – Overall classification**

| Types | Category No. | Functional Classification | | |
|---|---|---|---|---|
| | | Fresh food compartment temp. in ºC | Frozen food compartment temp. in ºC | Description |
| Refrigerator | Category 1 | +5 | Nil | A refrigerator without a frozen food compartment |
| | Category 2 | +5 | ≤ -6 | A refrigerator with a 1-star frozen food compartment |
| | Category 3 | +5 | ≤ -12 | A refrigerator with a 2-star frozen food compartment |
| | Category 4 | +5 | ≤ -18 | A refrigerator with a 3-star frozen food compartment |
| Refrigerator -freezer | Category 5 | +5 | ≤ -18 | A refrigerator with a 4-star frozen food compartment |
| | Category 6 | +5 | ≤ -18 | A Category 5 refrigerator incorporating means to prevent the formation of frost on contents |
| Freezer | Category 7 | Nil | ≤ -18 | A refrigerating appliance in which the entire storage volume is intended for freezing food. |
| | Category 8 | Nil | ≤ -18 | A Category 7 refrigerating appliance incorporating means to prevent the formation of frost. |

7.4. Tests Required to be Carried Out

The tests specified in this clause are required to be carried out, in accordance with ISO 5155, ISO 7371, ISO 8187 and ISO 8561 or ISO 15502, or other equivalent international standards approved by the Director, in order to find out the energy efficiency and performance characteristics of a refrigerating appliance. A test report required to be submitted to the Director under section 6 of the Ordinance shall contain the results of these tests:

(a) Measurement of storage temperatures of compartments.

(b) Measurement of storage volumes of compartments.

(c) Energy consumption test.

(d) Freezing test (for only food freezer or refrigerating appliance having food freezer compartment).

The refrigerating appliance shall be tested at a voltage of 380/220V and a frequency of 50Hz with tolerances as specified in the relevant ISO standards.

7.5. Test Methodology and Energy Efficiency Grading

7.5.1. Measurement of Energy Consumption

The methodology for measuring energy consumption (kWh/24h) shall be based on:

(a) ISO 5155, ISO 7371, ISO 8187 and ISO 8561; or

(b) ISO 15502; or

(c) other equivalent international standards approved by the Director.

The specified international standards (ISO) shall be referred to for actual performance requirements and procedural descriptions. The importer or manufacturer shall clearly indicate which test standard(s) they follow in testing their refrigerating appliances.

(a) ISO 5155 applies to frozen food storage cabinets and food freezers not cooled by internal forced air circulation (i.e. Category 7)

(b) ISO 7371 applies to refrigerators with or without low-temperature compartment not cooled by internal forced air circulation (i.e. Category 1)

(c) ISO 8187 applies to refrigerator-freezer not cooled by internal forced air circulation (i.e. Categories 2, 3, 4 and 5)

(d) ISO 8561 applies to frost-free refrigerating appliances – refrigerators, refrigerator-freezer, frozen food storage cabinets and food freezers cooled by internal forced air circulation. (i.e. Categories 6 and 8)

(e) ISO 15502 applies to household refrigerating appliances. (i.e. all Categories)

7.5.2. Calculation of Adjusted Volume

The refrigerating appliance storage volumes of the different compartments in litres shall be measured in accordance with the standards specified in clause 7.5.1 of the Code. The respective adjusted volume of the refrigerating appliance shall then be the sum of the measured storage volumes of the different compartments weighted by

the difference in temperatures between the interior of the compartments and the ambient temperature. The adjusted volume $V_{adj}$ is calculated as follows—

$V_{adj} = \Sigma V_i \times \Omega$ …….. (eq. 1)

where $V_i$ = the measured storage volume of an individual compartment

$\Omega$ = the weighting factor given by the following equation:

$$\Omega = \frac{T_a - T_i}{T_a - T_r} \quad \text{…….. (eq. 2)}$$

where $T_a$ = test room ambient temperature which is taken as 25 °C

$T_i$ = the rated temperature in the individual compartment concerned

$T_r$ = the rated temperature in the fresh food compartment which is taken as 5°C

A summary of eight simple equations for calculating the adjusted volume of each refrigerating appliance category is shown in Table 7.4.

**Table 7.4 – Adjusted volume ($V_{adj}$) calculation for all categories of the refrigerating appliances**

| Refrigerating Appliance Category | Adjusted Volume (in litre) | Equation No.*(Note)* |
|---|---|---|
| Category 1 | $V_r$ | 3 |
| Category 2 | $V_r + 1.55 \times V_{ffc}$ | 4 |
| Category 3 | $V_r + 1.85 \times V_{ffc}$ | 5 |
| Category 4 | $V_r + 2.15 \times V_{ffc}$ | 6 |
| Category 5 | $V_r + 2.15 \times V_{ffc}$ | 7 |
| Category 6 | $V_r + 2.15 \times V_{ffc}$ | 8 |
| Category 7 | $2.15 \times V_{ffc}$ | 9 |
| Category 8 | $2.15 \times V_{ffc}$ | 10 |

*where* $V_r$ *= Storage volume of fresh food compartment*

$V_{ffc}$ *= Storage volume of frozen food compartment*

*Note: These equations are used for those refrigerating appliances with fresh food compartment and frozen food compartment only. For refrigerating appliances with*

*additional chill compartment and/or cellar compartment, additional terms obtained by calculating equation 2 shall be added to these equations. For illustration, please refer to Appendix 2A.*

***Explanatory note for sample calculation of adjusted volume:***
***To illustrate how Equation 6 is derived for a category 4 refrigerating appliance:***

*Category 4 is defined as a refrigerator comprising one fresh food compartment ($V_r$) and one 3-star frozen food compartment ($V_{ffc}$).*

*By equation 1:* $V_{adj} = \Sigma V_i \times \Omega$.

*Total adjusted Volume = (Storage volume of fresh food compartment $V_r$) + (Storage volume of weighted 3-star frozen food compartment $V_{ffc}$)*

*From equation 2:*

$$V_{adj} = V_r \times \left(\frac{T_a - T_r}{T_a - T_r}\right) + V_{ffc} \times \left(\frac{T_a - T_{ffc}}{T_a - T_r}\right) \quad \text{.....(eq. 11)}$$

*Since temperature of a 3-Star compartment* $T_i = T_{ffc} = -18$ ℃, and *temperature of a fresh food compartment* $T_r = 5$ ℃,

*Hence* $V_{adj} = V_r \times \left(\frac{25-5}{25-5}\right) + V_{ffc} \times \left(\frac{25-(-18)}{25-5}\right)$

$$V_{adj} = V_r + 2.15 \times V_{ffc}$$

7.5.3. Energy Efficiency Definition of Refrigerating Appliances

(a) The energy efficiency performance of a refrigerating appliance is defined as the maximum allowable energy consumed per unit storage volume for the storage of food stuff adjusted for the relative contribution to the total energy consumption according to the different temperatures of its compartments with the fresh food temperature 5 °C taken as the reference. For a refrigerating appliance with more than just the fresh food compartment, the energy consumption is not only a function of the refrigerating appliance storage volumes but also the relative sizes of the fresh food and other compartment storage volumes.

(b) The energy consumption test measures the energy consumption of the refrigerating appliance in kWh/24h. The annual energy consumption of the

refrigerating appliance is obtained by multiplying the figure of the measured energy consumption (kWh/24h) by 365.

(c) The energy efficiency of a refrigerating appliance is inversely related to the refrigerating appliance energy efficiency ratio which is expressed in the unit of kWh/year/litre.

Refrigerating Appliance Energy Efficiency Ratio =

$$\frac{\text{Annual Energy Consumption}}{\text{Adjusted Volume}} \text{ kWh/yr/litre} \quad \text{……..……(eq. 12)}$$

(i.e. the lower the ratio the better is the energy efficiency)

7.5.4. Average Appliance Energy Consumption

(a) The Average Appliance Energy Consumption line equations developed from equation (12) represent the average annual energy consumption for refrigerating appliances in Hong Kong.

(b) The Average Annual Energy Consumption of a refrigerating appliance shall be determined in accordance with Table 7.5.

**Table 7.5 – Average appliance energy consumption**

| Refrigerating Appliance Category | Average Annual Energy Consumption (kWh/yr) | Equation No. |
|---|---|---|
| Category 1 | $V_{adj}$ x 0.233 + 245 | 13 |
| Category 2 | $V_{adj}$ x 0.643 + 191 | 14 |
| Category 3 | $V_{adj}$ x 0.450 + 245 | 15 |
| Category 4 | $V_{adj}$ x 0.657 + 235 | 16 |
| Category 5 | $V_{adj}$ x 0.777 + 303 | 17 |
| Category 6 | 1.35 x ( $V_{adj}$ x 0.777 + 303)*(Note)* | 18 |
| Category 7 | Chest freezer: $V_{adj}$ x 0.446 + 181 | 19 |
| | Upright freezer: $V_{adj}$ x 0.472 + 286 | 20 |
| Category 8 | Chest freezer: 1.35 x ($V_{adj}$ x 0.446 + 181)*(Note)* | 21 |
| | Upright freezer: 1.35 x ($V_{adj}$ x 0.472 + 286)*(Note)* | 22 |

*Note: The figure 1.35 in these equations is the correction factor for no-frost models.*

7.5.5. Energy Efficiency Grading

(a) Energy Consumption Index ($I_\varepsilon$)

The energy consumption index ($I_\varepsilon$) of a refrigerating appliance is defined as the ratio of the actual energy consumption of the refrigerating appliance to the Average Appliance Energy Consumption (as found from the associated average annual energy consumption equation in clause 7.5.4 of the Code). The indices are expressed in percentages. Thus, within a category, a refrigerating appliance with a lower energy consumption index (i.e. a lower percentage) consumes less energy than a refrigerating appliance with a higher energy consumption index (i.e. a higher percentage). The energy consumption index is calculated as follows—

$$\text{Energy Consumption Index } (I_\varepsilon) = \frac{E}{E_{av}} \times 100\% \quad \text{.....(eq. 23)}$$

where

E = actual annual energy consumption of the refrigerating appliance measured in energy consumption test.

$E_{av}$ = average annual energy consumption as determined from Table 7.5.

(b) Refrigerating Appliance Energy Efficiency Grading

The energy efficiency grading of a refrigerating appliance shall be determined as shown in Table 7.6, with Grade 1 having the best performance and Grade 5 having the worst performance.

**Table 7.6 – Derivation of energy efficiency grades**

| **Energy Consumption Index : $I_\varepsilon$ (%)** | **Energy Efficiency Grade** *(Note)* |
|---|---|
| $I_\varepsilon \leq 63$ | 1 |
| $63 < I_\varepsilon \leq 80$ | 2 |
| $80 < I_\varepsilon \leq 100$ | 3 |
| $100 < I_\varepsilon \leq 125$ | 4 |
| $125 < I_\varepsilon$ | 5 |

*Note: A specified person shall note and ensure that the actual energy efficiency performance of all his/her refrigerating appliances of the same model supplied in the market shall fall in the energy efficiency grade which is the same as or better than that submitted to the Director. In this connection, the specified person shall take due consideration of the variation of energy efficiency performance of the refrigerating appliances to be supplied in the market, and specify the lowest possible energy efficiency grade in the specified information of the concerned model submitted to the Director, notwithstanding that the particular test report submitted may reflect a higher energy efficiency grade.*

An example illustrating the method on how to determine the energy efficiency grade of a refrigerating appliance is shown in Appendix 2A.

7.6. Performance Requirements

7.6.1. The results of the test carried out in accordance with ISO 5155, ISO 7371, ISO 8187 and ISO 8561, or ISO 15502, or other equivalent international standards approved by

the Director shall show that the concerned model of the refrigerating appliance conforms with the following performance requirements—

(a) Measurement of Storage Temperature

The measured storage temperatures of fresh food storage compartment, frozen food storage compartment, food freezer compartment, chill compartment and cellar compartment, where applicable, shall comply with the requirements of Tables 7.2A and 7.2B if the tests are carried out in accordance with the standards in clause 7.3.1(b)(i) of the Code, or Table 7.2C if the tests are carried out in accordance with the standard in clause 7.3.1(b)(ii) of the Code. (Note: This measurement test shall be carried out before the energy consumption test is performed.)

(b) Measurement of Storage Volume

The measured storage volume for each of the compartments shall not be less than the rated storage volume by more than 3% or 1 litre, whichever is the greater value. Where the volumes of the cellar compartment and fresh food storage compartment are adjustable relative to one another by the user, this requirement applies when the cellar compartment is adjusted to its minimum volume.

(c) Energy Consumption Test

The measured energy consumption (kWh/24h) in the energy consumption test shall not be greater than the rated energy consumption by more than 15%.

(d) Freezing Test

(For only food freezer or refrigerating appliance having food freezer compartment)

The freezing capacity shall meet the requirements of at least 4.5 kg of test packages per 100-litre of its storage volume in 24-hour, and in no case less than 2 kg. The measured freezing capacity shall not be less than the rated freezing capacity by more than 15% of the latter. For food freezer, it shall have one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of $-18^{o}C$ and which is also suitable for the storage of frozen food under three-star storage conditions.

7.6.2. The rated storage volume, the rated energy consumption and the rated freezing capacity as declared by the manufacturer or importer shall meet the requirements in clause 7.6.1

of the Code.

7.7. Safety Requirements

In addition to the energy efficiency performance requirements, all refrigerating appliances shall comply with the Electrical Products (Safety) Regulation of the HKSAR and the safety standards specified under the Regulation, and all other legislations concerning the safety of the refrigerating appliance, e.g. the Gas Safety Ordinance and its subsidiary legislations, as appropriate.

7.8. Number of Samples to be Tested

For submission of product information of a model under section 6 of the Ordinance, a test report on one sample of the model shall be submitted.

7.9. Energy Label

7.9.1. The specification of the energy label for refrigerating appliance is shown in Appendix 2B. After a reference number has been assigned to a product model in the name of a specified person and included in the Director's record, the specified person shall produce the energy label for his/her products of the listed model showing the energy efficiency grade and associated information in strict accordance with the requirements in Appendix 2B.

7.9.2. The energy label is to be—

(a) attached or affixed—

(i) to the top front door or a prominent position of the refrigerating appliance; or

(ii) if only part of the refrigerating appliance is being exhibited, to a prominent position of that part of the refrigerating appliance;

and is to be clearly visible; or

(b) attached to the refrigerating appliance or its packaging in a manner approved by the Director.

7.9.3. The energy label shall be of cardboard, if it is to be attached as a swing tag, or be self-adhesive and shall be cut to the outline shown in Appendix 2B. A trim or die cut margin of up to 2 mm around the energy label is acceptable.

7.9.4. The paper used for the energy label shall be durable with good wear and tear characteristics.

## 8. Energy Efficiency Labelling for Compact Fluorescent Lamps

8.1. Scope

8.1.1 Clause 8 of the Code, unless the Director provides otherwise, applies to a compact fluorescent lamp defined in the Ordinance, that is, the products specified in clauses 8.1.2 and 8.1.3.

8.1.2 "Compact fluorescent lamp", subject to clause 8.1.3 of the Code—

(a) means a type of fluorescent lamp which has a single lamp cap; and

(b) includes integrated type compact fluorescent lamps that—

(i) use mains electricity as the primary power source;

(ii) have a rated lamp wattage up to 60 watts; and

(iii) have a screw or bayonet cap.

8.1.3 "Compact fluorescent lamp" does not include—

(a) non-integrated type compact fluorescent lamps;

(b) reflector compact fluorescent lamps; or

(c) cold cathode fluorescent lamps.

8.2. Definitions

This clause provides definitions of terms used in clause 8 of the Code. Unless otherwise specified, the definitions adopted in the clause 8 follow those stipulated in the Ordinance, if any.

| | |
|---|---|
| *ageing period* | means the time required for the initial burn-in of the lamp. |
| *ballast* | means a device used with an electric-discharge lamp to obtain the necessary circuit conditions (voltage, current, and wave form) for starting and operating. |
| *bayonet cap* | means the bayonet cap as defined in IEC 60061 or other equivalent international standards approved by the Director. |
| *CIE* | means International Commission on Illumination (the latest edition of the standard shall be followed for test methodology). |

*cold cathode fluorescent lamp* means a lamp of a type whose principle of illumination is the same as that of a conventional fluorescent lamp except that it—

(a) does not require heating of electrodes during starting and operating; and

(b) operates at a much higher voltage and lower current to start and maintain the discharge.

*full test report* in relation to a compact fluorescent lamp, means a test report that presents the results of a test carried out—

(a) to find out all aspects of the lamp's energy efficiency and performance characteristics specified in the Code; and

(b) to a standard specified in the Code.

*IEC* means International Electrotechnical Commission (the latest edition of the standard shall be followed for test methodology).

*integrated type CFL* means a compact fluorescent lamp of a type that—

(a) is a single integrated assembly comprising a lamp cap, a light source and additional elements necessary for starting and for stable operation of the light source, and

(b) cannot be dismantled without being permanently damaged.

*interim test report* in relation to a compact fluorescent lamp, means a test report that presents the results of a test carried out—

(a) to find out certain aspects of the lamp's energy efficiency and performance characteristics specified in the Code; and

(b) to a standard specified in the Code.

*life to 50% failures (average life)* means the length of time during which 50% of the compact fluorescent lamps reach the end of their individual lives.

| | |
|---|---|
| *lumen maintenance* | 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. |
| *luminous efficacy (lm/W)* | means a ratio of luminous flux emitted by a lamp to the electrical power consumed by the lamp. |
| *luminous flux (lm)* | means a quantitative measure of light emitted by a light 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. |
| *non-integrated type CFL* | means a compact fluorescent lamp of a type that is electrically connected to an external ballast for operation. |
| *progress test report* | in relation to a compact fluorescent lamp, means a test report—<br>(a) that is submitted together with or after the submission of an interim test report; and<br>(b) that presents the results of a test carried out—<br>(i) to find out the aspects of the lamp's energy efficiency and performance characteristics that have not been covered by the interim test report and have been specified in the Code; and<br>(ii) to a standard specified in the Code. |
| *rated life to 50% failures (rated average life)* | means the life to 50% failures of a CFL as determined and declared by the manufacturer or importer of the CFL in accordance with the standard and requirements specified in the Code . |
| *rated lumen maintenance* | means the lumen maintenance of a CFL as determined and declared by the manufacturer or importer of the CFL in accordance with the standard and requirements specified in the Code. |

| | |
|---|---|
| *rated luminous flux* | means the luminous flux of a CFL as determined and declared by the manufacturer or importer of the CFL in accordance with the standard and requirements specified in the Code. |
| *rated power consumption* | means the power input of a CFL as determined and declared by the manufacturer or importer of the CFL in accordance with the standard and requirements specified in the Code. |
| *rated lamp wattage* | means the wattage of a CFL as determined and declared by the manufacturer or importer of the CFL in accordance with the standard and requirements specified in the Code. (Note: the rated lamp wattage is identical with the rated power consumption in value.) |
| *reflector CFL* | means a compact fluorescent lamp of a type that comprises one or more compact fluorescent arc tubes mounted into a reflector housing for directing light from light source, both of which cannot be dismantled without being permanently damaged. |
| *screw cap* | means the screw cap as defined in IEC 60061 or other equivalent international standards approved by the Director. |

8.3. Tests Required to be Carried Out

The tests specified in this clause are required to be carried out, in accordance with IEC 60969 and CIE 84, or other equivalent international standards approved by the Director, in order to find out the energy efficiency and performance characteristics of a compact fluorescent lamp. A test report required to be submitted to the Director under section 6 of the Ordinance shall contain the results of these tests:

(a) Measurement of power consumption at the end of 100-hour ageing period.

(b) Measurement of lumen output (luminous flux) at the end of 100-hour ageing period (i.e. the initial value of luminous flux).

(c) Measurement of lumen maintenance at 2,000-hour.

(d) Measurement of life to 50% failures (average life).

8.4. Test Methodology and Standards

8.4.1. Test Standards – Technical Performance

(a) 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.

(b) 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.

(i) IEC 60969, Self-ballasted Lamps for General Lighting Services – Performance Requirements; and

(ii) CIE 84, The Measurement of Luminous Flux.

8.4.2. Test Conditions

(a) The tests shall be carried out at a voltage of 220V and a frequency of 50Hz with tolerances as specified in the standards mentioned in clause 8.4 of the Code. The sample size for carrying out all the tests shall be determined in accordance with clause 8.8 of the Code.

(b) For CFLs of the same characteristics but with different colour temperatures, they shall be tested individually as their energy efficiency performances are different. For CFLs with same energy efficiency and performance characteristics (including colour temperatures) but with different lamp caps, they may be treated as belonging to the same family of models and adopt the same test report.

(c) The test conditions shall be as follows—

(i) the selection, seasoning and stabilization of test lamps, and the test conditions shall be as described in IEC 60969; and

(ii) test lamps shall be tested in a vertical base-up position.

8.4.3. Measurement of Luminous Flux of Test Lamp

The lamp luminous flux at the test conditions shall be measured in accordance with the requirements of CIE 84.

8.4.4. Measurement of Electrical Characteristics of Test Lamp

The electrical characteristics shall be measured in accordance with IEC 60969.

8.4.5. Measurement of Lumen Maintenance and Lamp Life

The lumen maintenance and lamp life at the test conditions shall be measured in

accordance with IEC 60969.

8.4.6. Determination of Lamp Luminous Efficacy

Lamp luminous efficacy ($E_m$) shall be determined by computing the ratio of the measured luminous flux and the corresponding electrical power input at equilibrium for the test conditions.

8.5. Energy Efficiency Grading

8.5.1. The energy efficiency grade of CFLs shall be determined as shown in Table 8.1, with Grade 1 having the best performance and Grade 5 having the worst performance.

8.5.2. In order to determine the energy efficiency grade according to clause 8.5.3 of the Code, the measured lamp luminous efficacy ($E_m$) obtained in clause 8.4 of the Code shall be compared with the following rated lamp luminous efficacy ($E_r$) which is determined and calculated based on the rated luminous flux and the rated wattage of the same product model—

$$\text{Rated Lamp Luminous Efficacy } (E_r) = \frac{\text{Rated Luminous Flux}}{\text{Rated Wattage}}$$

The energy efficiency grade is determined by using the measured lamp luminous efficacy ($E_m$) or the rated lamp luminous efficacy ($E_r$), whichever is smaller.

8.5.3. In Table 8.1, for any CFL having a Grade 1 or 2 label, both the measured average life and the rated average life shall not be less than 8,000 hours, and both the measured lumen maintenance and the rated lumen maintenance at 2,000 hours shall not be less than 80%, and for any CFL having a Grade 3 or 4 label, both the measured average life and the rated average life shall not be less than 6,000 hours, and both the measured lumen maintenance and the rated lumen maintenance at 2,000 hours shall not be less than 78%. Any CFL with the measured average life or the rated average life less than 6,000 hours, or the measured lumen maintenance or the rated lumen maintenance at 2,000 hours less than 78%, can only obtain a Grade 5 label.

**Table 8.1 – Derivation of energy efficiency grades**

| Rated Lamp Wattage ($L_w$) | X *Note (1)* (Lumen/W) | | | | |
|---|---|---|---|---|---|
| | Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 |
| | *Note (2)* | | *Note (3)* | | *Note (4)* |
| ≦10W | X≧49.5 | 49.5>X≧45.0 | 45.0>X≧40.5 | X<40.5 | N/A |
| 11-20W | X≧55.0 | 55.0>X≧50.0 | 50.0>X≧45.0 | X<45.0 | N/A |
| 21-30W | X≧60.5 | 60.5>X≧55.0 | 55.0>X≧49.5 | X<49.5 | N/A |
| ≧31W | X≧66.0 | 66.0>X≧60.0 | 60.0>X≧54.0 | X<54.0 | N/A |

*Note:*

*(1) Where X = measured lamp luminous efficacy ($E_m$) or rated lamp luminous efficacy ($E_r$), whichever is smaller.*

*(2) Applicable to a CFL with both measured average life and rated average life not less than 8,000 hours, and both measured lumen maintenance and rated lumen maintenance at 2,000 hours not less than 80%.*

*(3) Applicable to a CFL with both measured average life and rated average life not less than 6,000 hours, and both measured lumen maintenance and rated lumen maintenance at 2,000 hours not less than 78%.*

*(4) Applicable to a CFL with measured average life or rated average life less than 6,000 hours, or measured lumen maintenance or rated lumen maintenance at 2,000 hours less than 78%.*

*A specified person shall note and ensure that the actual energy efficiency performance of all his/her CFLs of the same model supplied in the market shall fall in the energy efficiency grade which is the same as or better than that submitted to the Director. In this connection, the specified person shall take due consideration of the variation of energy efficiency performance of the CFLs to be supplied in the market, and specify the lowest possible energy efficiency grade in the specified information of the concerned model submitted to the Director, notwithstanding that the particular test report submitted may reflect a higher energy efficiency grade.*

8.5.4. The aforesaid measured lamp luminous efficacy refers to the average values (both luminous flux and power consumption) measured at the end of the 100-hour ageing period. The aforesaid lumen maintenance refers to the average value measured at the

end of 2,000 hours. The determination of the average values shall be in accordance with Table 8.3.

8.5.5. 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.

8.5.6. An example illustrating the method on how to determine the energy efficiency grade of a CFL is shown in Appendix 3A.

8.6. Performance Requirements

8.6.1. The results of the test carried out in accordance with CIE 84 and IEC 60969, or other equivalent international standards approved by the Director shall show that the model concerned of the CFL conforms with the following performance requirements—

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

(c) The measured lumen maintenance at 2,000 hours shall not be less than the rated lumen maintenance (both the measured lumen maintenance and the rated lumen maintenance at 2,000 hours shall not be less than 80% for obtaining a Grade 1 or 2 label or 78% for obtaining a Grade 3 or 4 label).

(d) The measured life to 50% failures (average life) shall not be less than the rated life to 50% failures (rated average life) (both the measured average life and the rated average life shall not be less than 8,000 hours for obtaining a Grade 1 or 2 label or 6,000 hours for obtaining a Grade 3 or 4 label).

8.6.2. The rated power consumption, rated lumen output, rated life to 50% failures and rated lumen maintenance as declared by the manufacturer or importer shall meet the requirements specified in clause 8.6.1 of the Code.

8.7. Safety Requirements

In addition to the energy efficiency performance requirements, all CFLs shall comply with the Electrical Products (Safety) Regulation of the HKSAR and the safety standards specified under the Regulation, and all other legislations concerning the safety of CFLs.

8.8. Number of Samples to be Tested

8.8.1. For submission of product information of a model under section 6 of the Ordinance, a test report on samples of a model shall be submitted. The minimum numbers of samples for the tests are indicated in Table 8.2.

**Table 8.2 – Minimum number of samples for tests**

| Tests Required | Minimum Number of Samples |
|---|---|
| Power consumption and luminous flux | 20 |
| Lumen maintenance | 10 |
| Life to 50% failures | 20 |

8.8.2. The test results of the samples shall be determined in accordance with the requirements in Table 8.3 and meet the performance requirements in clause 8.6 of the Code.

**Table 8.3 – Determination of test results**

| Tests Required | Test Results |
|---|---|
| Power consumption (at the end of 100-hour ageing period) | The average of the measured values of all the tested samples shall meet the performance requirements in clause 8.6 of the Code |
| Luminous flux (at the end of 100-hour ageing period) | |
| Lumen maintenance (at the end of 2,000-hour including the ageing period) | The average of the measured values of all the tested samples shall meet the performance requirements in clause 8.6 of the Code |
| Life to 50% failures | Measured life to 50% failures (measured average life) $\geqq$ rated life to 50% failures (rated average life) |

8.8.3. The measured lamp luminous efficacy shall be determined by computing the ratio of the average value of the luminous flux and the average value of the power consumption as

determined in accordance with clause 8.4 of the Code.

8.9. Submission of Test Reports

8.9.1. Since it may take a long time to complete the full tests for CFLs, the person submitting the specified information of a product model may submit the test reports in stages, namely interim test report, progress test report and full test report as specified in sections 6 and 7 of the Ordinance.

8.9.2. Initially, an interim test report may be submitted under section 6 of the Ordinance. The interim test report shall contain the results of the tests carried out to find out—

(a) the measured power consumption (at the end of 100-hour);

(b) the measured lumen output (luminous flux) (at the end of 100-hour);

(c) the measured lamp luminous efficacy (at the end of 100-hour);

(d) the lumen maintenance (at the end of 2,000-hour); and

(e) the lamp life (up to at least 2,000 hours).

If the Director is satisfied that the specified information and specified document (including the interim test report) have been submitted as required under section 6 of the Ordinance, a reference number shall then be assigned to the model.

8.9.3. After submitting the interim test report, the specified person is to submit progress test reports to the Director at intervals of not exceeding 6 months after the date of the submission of the interim test report until the specified person submits a full test report as required under section 7 of the Ordinance.

8.9.4. The progress test reports shall present the latest results of the test in progress with respect to the lamp life. The full test report shall present the final results of all the tests required in the Code.

8.9.5. The results of the lamp life test presented in the interim test report, progress test reports and full test report shall refer to the same test on the same set of samples.

8.9.6. The interim test report, progress test report and full test report shall be issued by a testing laboratory meeting the requirements in clause 4 of the Code, and these test reports shall meet the requirements in clause 5 of the Code.

8.9.7. If the test results in the progress test reports and full test report show that the requirements as stipulated in clause 8.6 of the Code cannot be met, the reference number previously assigned to the product model will be removed from the record

pursuant to section 16 of the Ordinance.

8.10. Energy Label

8.10.1. The specification of the energy label for CFL is shown in Appendix 3B. After a reference number has been assigned to a product model in the name of the specified person and included in the Director's record, the specified person shall produce the energy label for his/her products of the listed model showing the energy efficiency grade and associated information in accordance with the requirements in Appendix 3B.

8.10.2. The energy label is to be—

(a) printed on or affixed to a prominent position of the individual product packaging and is to be clearly visible; or

(b) attached to the product packaging in a manner approved by the Director.

8.10.3. The energy label shall be self-adhesive, if it is to be affixed on each individual packaging, and shall be cut to the outline shown in Appendix 3B. A trim or die cut margin of up to 2 mm around the energy label is acceptable.

8.10.4. The size of the energy label is to be chosen according to the following criteria—

(a) The energy label is to be contained in a blank border, the width of which must be at least 2 mm. The energy label must not cover more than 50% of the surface area of the largest side of the product packaging.

(b) The largest energy label is to be first chosen and checked whether it complies with all the requirements in paragraph (a). If those requirements cannot be met, then the second largest energy label (in the descending order of 90%, 80%, 70% or 60% of the largest energy label) is to be chosen. 60% of the largest energy label is the minimum size to be used. This selection process is to be repeated until an appropriate energy label is chosen.

(c) Where the product packaging is too small to accommodate the smallest energy label specified in this Part, the specified person of the product is to apply for the Director's directions on the manner of displaying the energy label on the packaging.

**Appendix 1A**

## Example for Calculating the Energy Efficiency Grade for Room Air Conditioners

The given room air conditioner is of Category 1 (i.e. window-type with cooling only function).

Measured Cooling Capacity ($\Phi_c$)…..... 3,550 Watts

Effective Power Input (Measured Power Consumption) ($P_E$)..... 1,370 Watts

From the Table 6.3, the Average Appliance Energy Consumption for Category 1 room air conditioner with the above specified cooling capacity is:

$E_{av}$ = 0.442 x $\Phi_c$ Watts

= 0.442 x 3550 Watts

= 1569 Watts

$$\text{Energy Consumption Index } I_\varepsilon = \frac{\text{Effective Power Input}}{\text{Average Appliance Energy Consumption}}$$

$$I_\varepsilon = \frac{P_E}{E_{av}}$$

$$I_\varepsilon = \frac{1370}{1569}$$

$$I_\varepsilon = 87.3\ \%$$

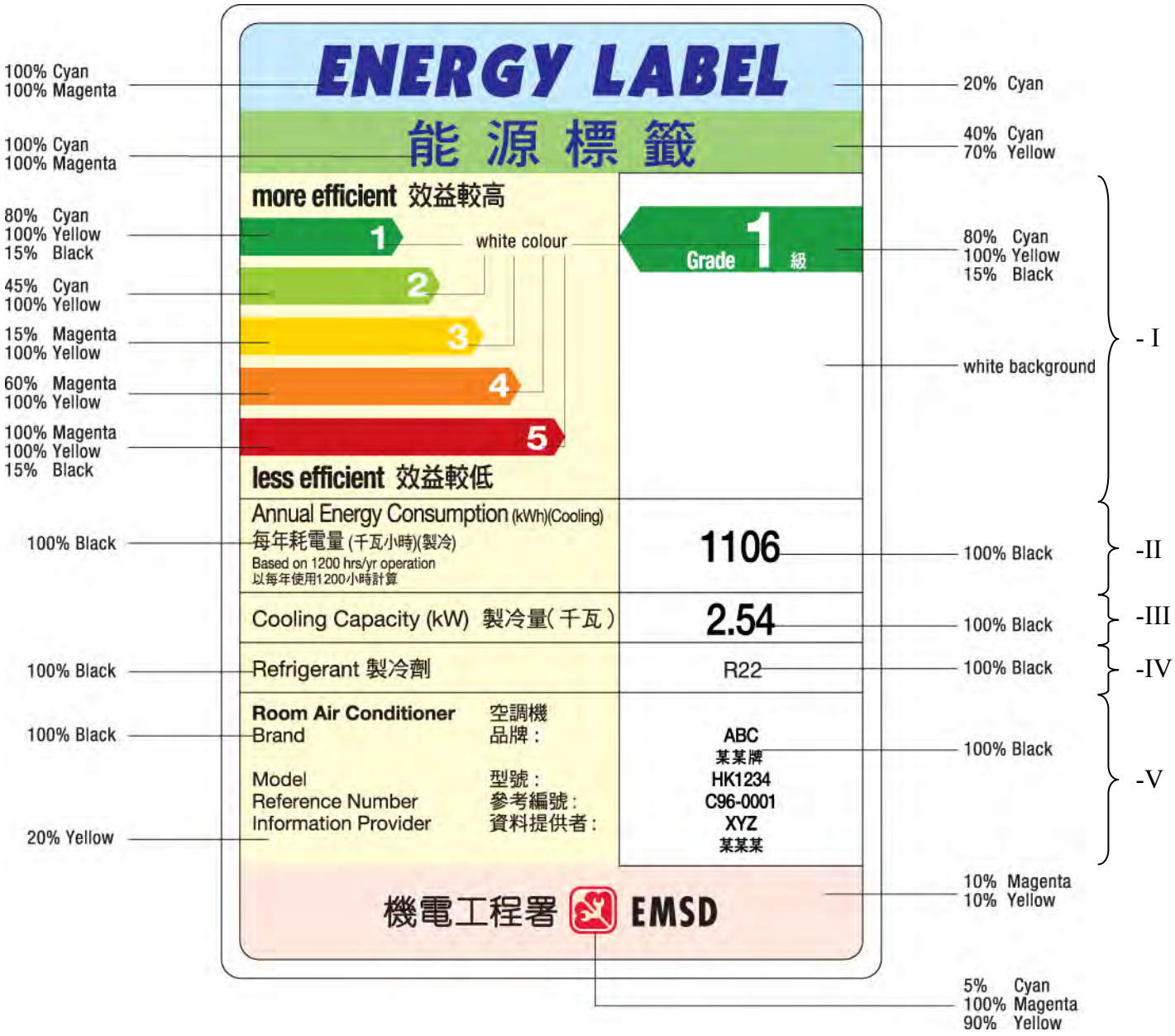
$$\mathbf{85 < I_\varepsilon < 95\ \%}$$

According to Table 6.4 in clause 0 of the Code, the room air conditioner is rated as a **Grade 2** room air conditioner.

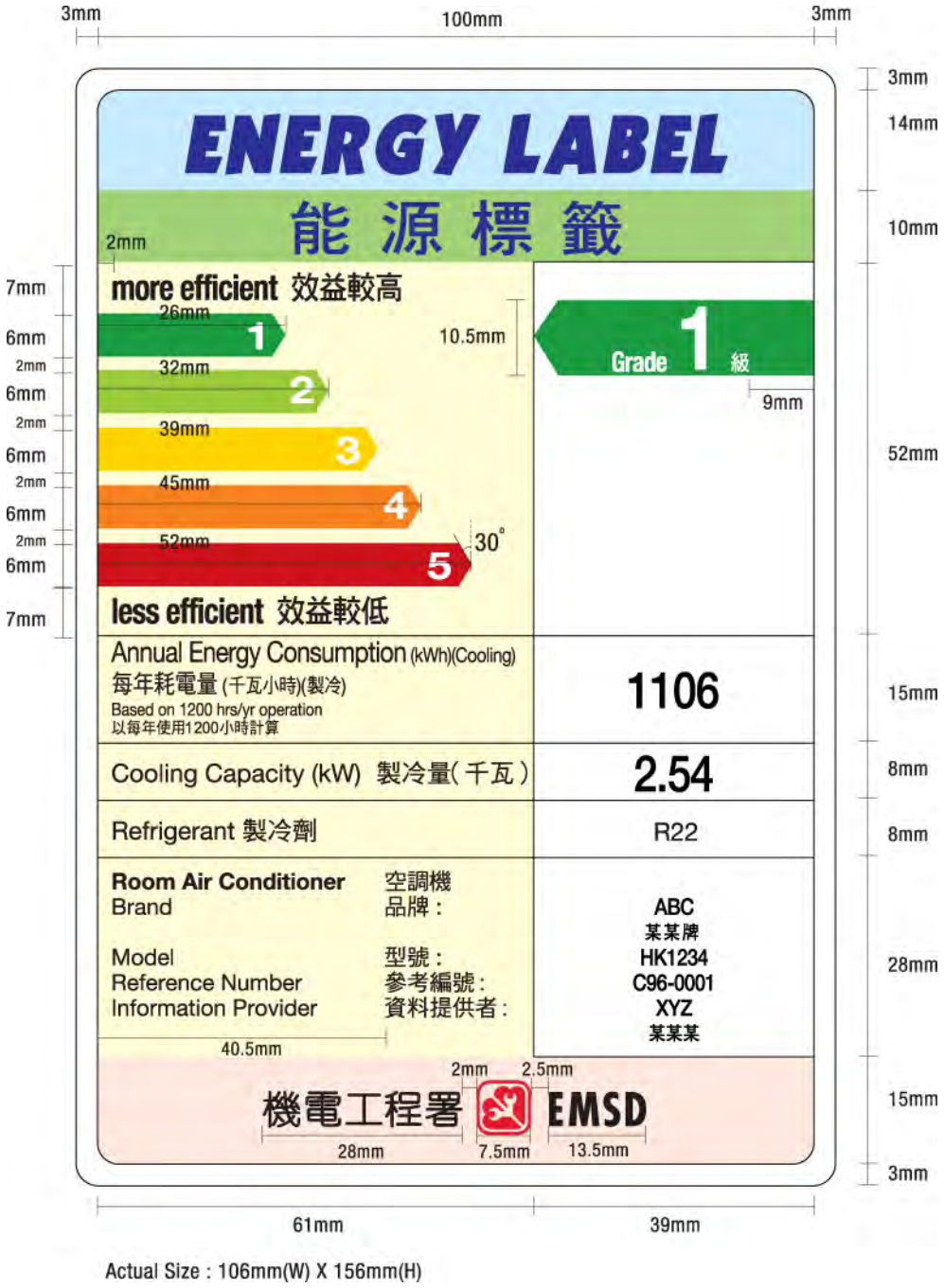
**Appendix 1B**

## Specification of Energy Label

(1) The colour and design of the energy label must be as specified in the diagram below—



(2) The dimensons of the energy label must be as specified in the diagram below—




Actual Size : 106mm(W) X 156mm(H)

(3) The energy label under clause 1 of Appendix 1B is divided into 5 rectangular areas (marked I, II, III, IV and V by the side of the label). The information to be contained in each area of the energy label is specified in column 2 of the following Table in relation to the area specified opposite to that information in column 1 of the Table.

| Area | Information to be contained |
|---|---|
| I | The energy efficiency grading of the model, calculated in accordance with the Code. The head of the arrow containing the energy efficiency grade number is to be placed at the same level and has the same colour as the head of the relevant arrow on the left. |
| II | The annual energy consumption, calculated by multiplying the measured power consumption in cooling mode at full load by an average of 1,200 hours per year, determined in accordance with the Code. |
| III | The cooling capacity, which is the measured cooling capacity in kW of the model in cooling mode at full load, determined in accordance with the Code. |
| IV | The type of refrigerant used for the model. |
| V | The brand name, the product model, the reference number assigned by the Director and the name of the information provider. The information provider is the specified person who submitted the specified information to the Director. |

(4) The specifications for the font size of the words printed on the energy label are as follows—

| Description on the Energy Label | Font and font size |
|---|---|
| ENERGY LABEL | 31 point Italic Kabel Ult BT (English) |
| 能源標籤 | 24 point DFHeibold (Chinese) |
| more efficient 效益較高 | 14 point Helvetica Neue Bold (English) |
| less efficient 效益較低 | 14 point DFHeiBold (Chinese) |
| Grade on the left (1, 2, 3, 4, 5) | 15 point Helvetica Neue Bold (English) |

| Description on the Energy Label | Font and font size |
|---|---|
| Grade on the right – | |
| The word “Grade” | 11 point Helvetica Neue Bold Condensed (English) |
| The figure “1” | 35.5 point Helvetica Neue Bold (English) |
| The word “級” | 9.5 point DFHeiBold (Chinese) |
| Annual Energy Consumption (kWh)(Cooling) | 11.5 (8) point Helvetica Roman (English) |
| 每年耗電量（千瓦小時）（製冷） | 10 (8) point DFHeiMedium (Chinese) |
| Based on 1 200 hrs/yr operation | 7 point Helvetica Roman (English) |
| 以每年使用 1 200 小時計算 | 7 point DFHeiMedium (Chinese) |
| Cooling Capacity (kW) | 10 point Helvetica Roman (English) |
| 製冷量（千瓦） | 10 point DFHeiMedium (Chinese) |
| Figures of annual energy consumption and cooling capacity on the right | 20 point Helvetica Medium |
| Refrigerant | 10 point Helvetica Roman (English) |
| 製冷劑 | 10 point DFHeiMedium (Chinese) |
| Character of refrigerant on the right | 10 point Helvetica Roman (English) |
| Room Air Conditioner | 9 point Helvetica Bold (English) |
| 空調機 | 9 point DFHeiMedium (Chinese) |
| Brand<br>Model<br>Reference Number<br>Information Provider | 9 point Helvetica Roman (English) |
| 品牌：<br>型號：<br>參考編號：<br>資料提供者： | 9 point DFHeiMedium (Chinese) |

| Description on the Energy Label | Font and font size |
|---|---|
| Characters of brand, model, reference number and information provider on the right | 9 point Helvetica Roman (English)<br>7.5 DFHeiMedium (Chinese) |
| 機電工程署 | 16 point Monotype Yuen (Chinese) |
| EMSD and its logo | 17.9 point Futura Bold Condensed (English) |

**Appendix 2A**

## Example for Calculating the Energy Efficiency Grade for Refrigerating Appliances

The given refrigerating appliance is a Category 6 no-frost refrigerator–freezer with a fresh food storage compartment at +5 °C, a 4-star freezer compartment at -18 °C and a chill compartment at 0 °C.

| | Measured Storage Volume (litre) | Weighting Factor Ω (given by eq.2) | Adjusted Volume (litre) *($V_{adj}$ given by eq. 1)* |
|---|---|---|---|
| Fresh food storage ($V_r$) | 174 | $\Omega_r$ = 1.00 | $V_r$ x $\Omega_r$ = 174 |
| Frozen food storage ($V_{ffc}$) | 100 | $\Omega_{ffc}$ = 2.15 | $V_{ffc}$ x $\Omega_{ffc}$ = 215 |
| Chill storage ($V_c$) | 67 | $\Omega_c$ = 1.25 | $V_c$ x $\Omega_c$ = 83.75 |
| Total: | 341 | | $\Sigma V \times \Omega$ = 472.75 |
| Annual Energy Consumption: | | | 456 kWh/year |

The adjusted volume for the refrigerating appliance is calculated according to the equations 1, 2 and 11 in clause 7.5.2 of the Code.

$$V_{adj} = \Sigma V \times \Omega = V_r \times \Omega_r + V_{ffc} \times \Omega_{ffc} + V_c \times \Omega_c$$
$$= 174 + 215 + 83.75$$
$$= 472.75 \text{ litres}$$

From the Table 7.5, the Average Appliance Energy Consumption for Category 6 refrigerating appliance is:

$$= V_{adj} \times 0.777 + 303$$
$$= 472.75 \times 0.777 + 303$$
$$= 670.3 \text{ kWh/year}$$

Considering it is a no-frost model, the average appliance energy consumption is multiplied by a factor of 1.35.

Therefore, it is 1.35 x 670.3 = 905 kWh/year

$$\text{Energy Consumption Index } I_\varepsilon = \frac{\text{Annual Energy Consumption}}{\text{Average Appliance Energy Consumption}}$$

$$I_\varepsilon = \frac{456}{905}$$

$$I_\varepsilon = 50.4\%$$

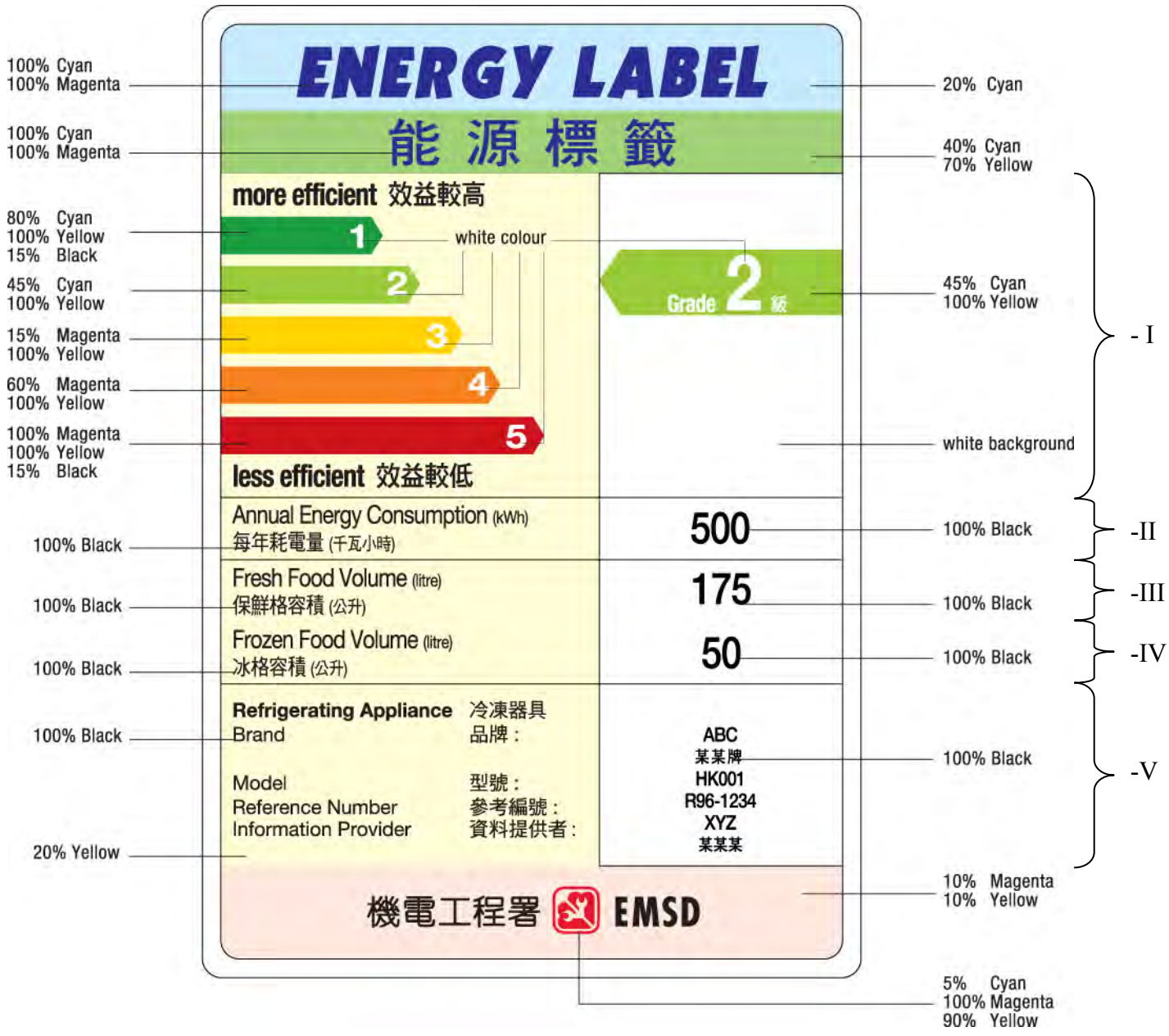
$$\mathbf{I_\varepsilon < 63\ \%}$$

According to Table 7.6 in clause 7 of the Code, the refrigerating appliance is rated as a **Grade 1** refrigerating appliance.

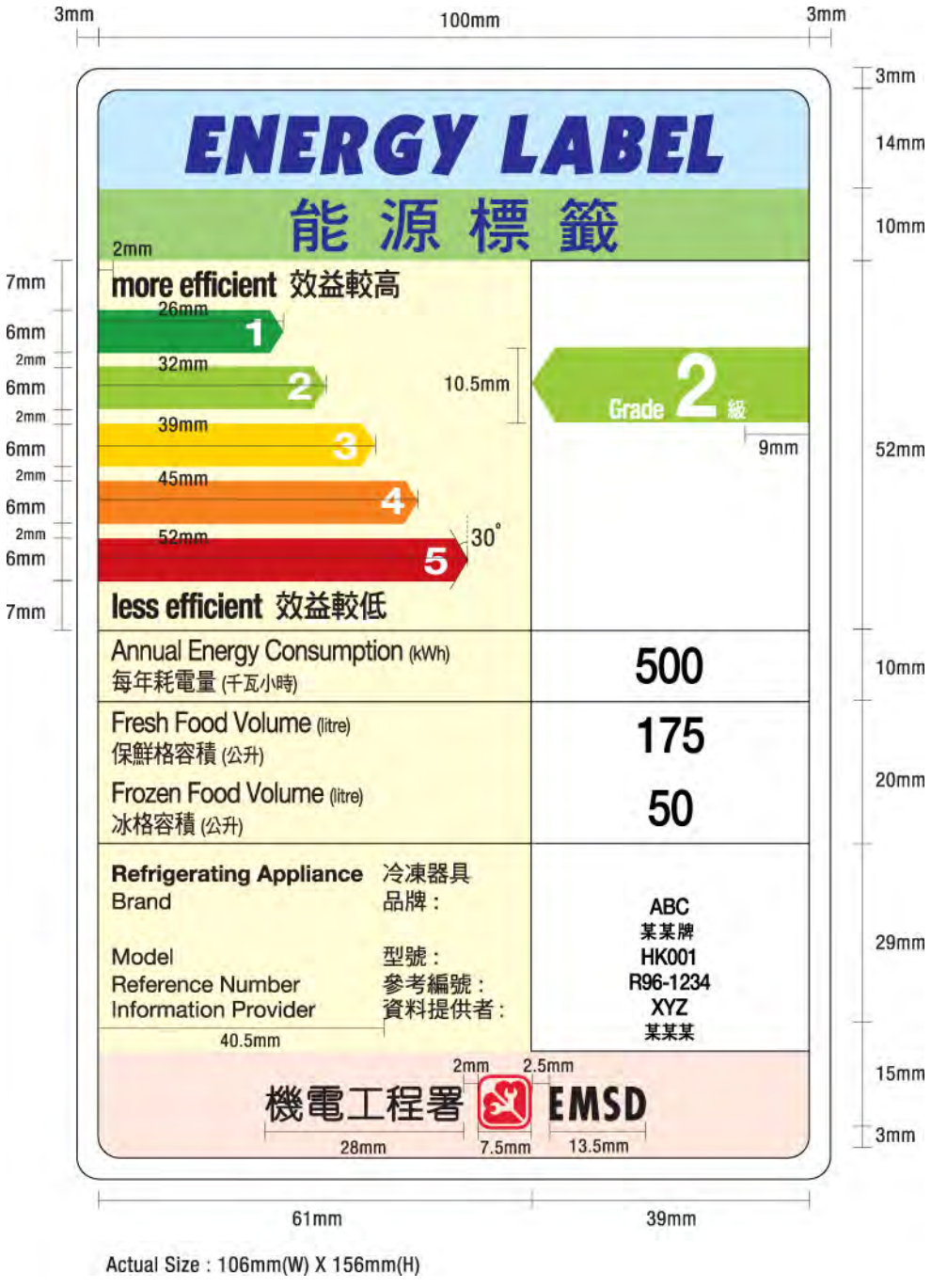
**Appendix 2B**

## Specification of Energy Label

(1) The colour and design of the energy label must be as specified in the diagram below—



(2) The dimensions of the energy label must be as specified in the diagram below—



(3) The energy label under clause 1 of Appendix 2B is divided into 5 rectangular areas (marked I, II, III, IV and V by the side of the label). The information to be contained in each area of the energy label is specified in column 2 of the following Table in relation to the area specified opposite to that information in column 1 of the Table.

| Area | Information to be contained |
|---|---|
| I | The energy efficiency grading of the model, calculated in accordance with the Code. The head of the arrow containing the energy efficiency grade number is to be placed at the same level and has the same colour as the head of the relevant arrow on the left. |
| II | The annual energy consumption, calculated by multiplying the measured energy consumption by 365 days, determined in accordance with the Code. |
| III | The fresh food volume, which is the sum of the measured net storage volume of all compartments whose operating temperature exceeds -6$^{o}$C, determined in accordance with the Code. (Note: the net storage volume refers to the storage volume in clause 7.2 of the Code.) |
| IV | The frozen food volume, which is the sum of the measured net storage volume of all frozen food storage compartments whose operating temperature is equal to or below -6$^{o}$C, determined in accordance with the Code. (Note: the net storage volume refers to the storage volume in clause 7.2 of the Code.) |
| V | The brand name, product model, the reference number assigned by the Director and the name of the information provider. The information provider is the specified person who submitted the specified information to the Director. |

(4) The specifications for the font sizes of the words printed on the energy label are as follows—

| Description on the Energy Label | Font and font size |
|---|---|
| ENERGY LABEL | 31 point Italic Kabel Ult BT (English) |
| 能源標籤 | 24 point DFHeibold (Chinese) |

| Description on the Energy Label | Font and font size |
|---|---|
| more efficient 效益較高<br>less efficient 效益較低 | 14 point Helvetica Neue Bold (English)<br>14 point DFHeiBold (Chinese) |
| Grade on the left (1, 2, 3, 4, 5) | 15 point Helvetica Neue Bold (English) |
| Grade on the right –<br>The word “Grade”<br>The figure “2”<br>The word “級” | <br>11 point Helvetica Neue Bold Condensed (English)<br>35.5 point Helvetica Neue Bold (English)<br>9.5 point DFHeiBold (Chinese) |
| Annual Energy Consumption (kWh)<br>每年耗電量（千瓦小時） | 11.5 (8) point Helvetica Roman (English)<br>10 (8) point DFHeiMedium (Chinese) |
| Fresh Food Volume (litre)<br>保鮮格容積（公升） | 11.5 (8) point Helvetica Roman (English)<br>10 (8) point DFHeiMedium (Chinese) |
| Frozen Food Volume (litre)<br>冰格容積（公升） | 11.5 (8) point Helvetica Roman (English)<br>10 (8) point DFHeiMedium (Chinese) |
| Figures of annual energy consumption and volumes on the right | 20 point Helvetica Medium |
| Refrigerating Appliance<br>冷凍器具 | 9 point Helvetica Bold (English)<br>9 point DFHeiMedium (Chinese) |
| Brand<br>Model<br>Reference Number<br>Information Provider | 9 point Helvetica Roman (English) |
| 品牌：<br>型號：<br>參考編號：<br>資料提供者： | 9 point DFHeiMedium (Chinese) |

| Description on the Energy Label | Font and font size |
|---|---|
| Characters of brand, model, reference number and information provider on the right | 9 point Helvetica Roman (English)<br>7.5 DFHeiMedium (Chinese) |
| 機電工程署 | 16 point Monotype Yuen (Chinese) |
| EMSD and its logo | 17.9 point Futura Bold Condensed (English) |

**Appendix 3A**

**Example for Calculating the Energy Efficiency Grade for Compact Fluorescent Lamps**

Rated power Input……..11W
Rated luminous flux……..……..600 lm
Rated lumen maintenance……85%
Rated average life……7,000 hours

Measured luminous flux and power input at the end of 100-hour ageing period:
Average power input…….10.7 W
Average luminous flux..……609.6 lm

Measured average luminous flux at 2000 hours……535.6 lm
Measured average life……8,000 hours

Measured lumen maintenance at 2000 hours:

$$= \frac{\text{Measured average luminous flux at 2000 hours}}{\text{Measured average luminous flux at 100 hours}} \text{ x } 100\%$$

= 535.6 / 609.6 x 100%

= 88% ≥ 80% of initial luminous flux at 100 hours

Measured Luminous Efficacy:

$$= \frac{\text{Measured luminous flux}}{\text{Measured power input}}$$

= 609.6 / 10.7

= 57 lm/W

Rated luminous Efficacy:

$$= \frac{\text{Rated luminous flux}}{\text{Rated power input}}$$

= 600 / 11

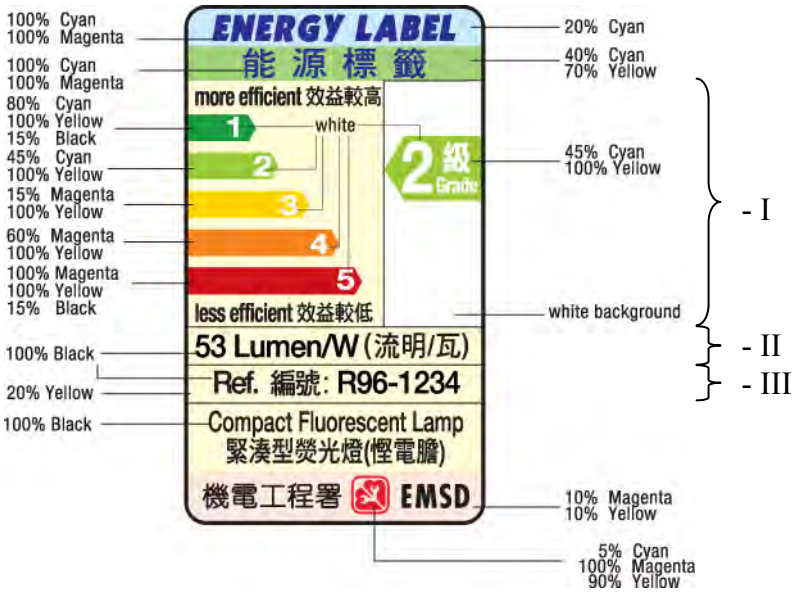
= 54.5 lm/W

Since the measured luminous efficacy ≥ rated luminous efficacy, the rated luminous efficacy is used to determine the energy efficiency grade
According to Table 8.1 in clause 8.5 of the Code, the CFL is rated as a **Grade 2** CFL**.**

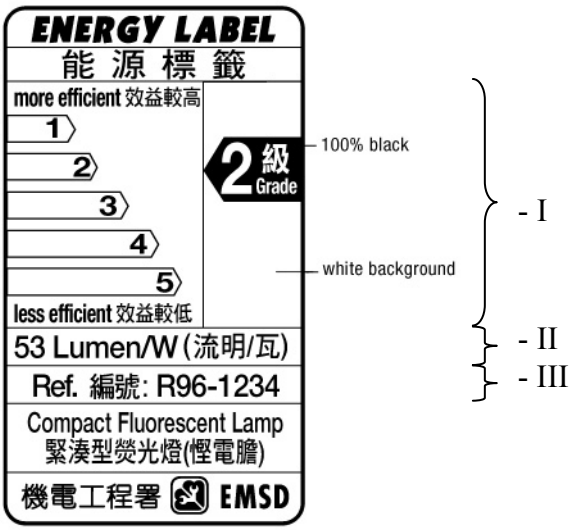
**Appendix 3B**

## Specification of Energy Label

(1) The colour and design of the largest energy label must be as specified in the diagram below. There are two versions of the energy labels, namely the colour version and black-on-white version. The supplier is to choose either one of the two versions.

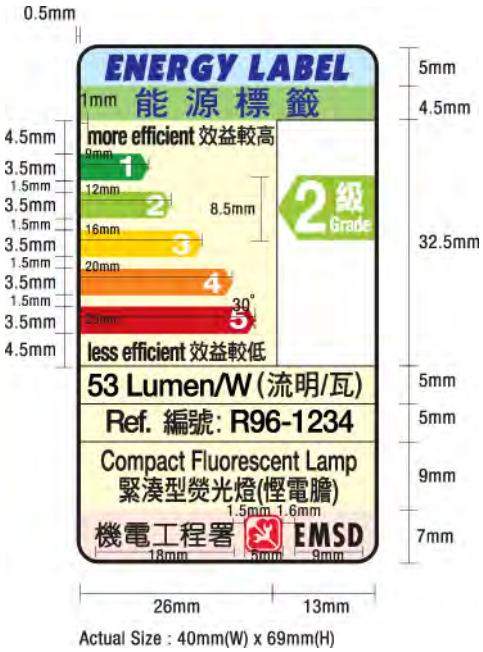



Colour Version




Black-on-white Version

(2) The dimensions of the largest energy label must be as specified in the diagram below—




(3) The energy label under clause 1 of Appendix 3B is divided into 3 rectangular areas (marked I, II and III by the side of the label). The information to be contained in each area of the energy label is specified in column 2 of the following Table in relation to the area specified opposite to that information in column 1 of the Table.

| Area | Information to be contained |
|---|---|
| I | The energy efficiency grading of the model, calculated in accordance with the Code. If a coloured label is chosen, the head of the arrow containing the energy efficiency grade number is to be placed at the same level and has the same colour as the head of the relevant arrow on the left. If a black-on-white label is chosen, the head of the arrow containing the energy efficiency grade number is to be placed at the same level as the head of the relevant arrow on the left and is in black. |
| II | The lumen per watt, which is the lamp lumen efficacy calculated by computing the ratio of the measured lamp luminous flux and the lamp electrical power input, determined in accordance with the Code. |
| III | The reference number assigned by the Director. |

(4) The specifications for the font size of the words printed on the largest energy label are as follows—

| Description on the Energy Label | Font and font size |
|---|---|
| ENERGY LABEL | 13 point Italic Kabel Ult BT (English) |
| 能源標籤 | 12.5 point DFHeibold (Chinese) |
| more efficient 效益較高<br>less efficient 效益較低 | 9.6 point Helvetica Neue Bold (English)<br>9.1 point DFHeiBold (Chinese) |
| Grade on the left (1, 2, 3, 4, 5) | 10.6 point Helvetica Neue Bold (English) |
| Grade on the right –<br>The word "Grade"<br>The figure "2"<br>The word "級" | <br>8 point Helvetica Neue Bold Condensed (English)<br>27 point Helvetica Neue Bold (English)<br>14 point DFHeiBold (Chinese) |
| Lumen/W<br>（流明/瓦） | 11.8 point Helvetica Neue Medium (English)<br>10.8 point DFHeiBold (Chinese) |
| Figure of lumen/W | 11.8 point Helvetica Neue Medium (English) |
| Ref.<br>編號： | 11.8 point Helvetica Neue Medium (English)<br>10.8 point DFHeiBold (Chinese) |
| Character of reference number | 11.8 point Helvetica Neue Medium (English) |
| Compact Fluorescent Lamp<br>緊湊型熒光燈(慳電膽) | 10.65 point Helvetica Neue Medium (English)<br>10.65 point DFHeiBold (Chinese) |
| 機電工程署<br>EMSD and its logo | 10.4 point Monotype Yuen (Chinese)<br>11.6 point Futura Bold Condensed (English) |