The Hong Kong Voluntary Energy Efficiency Labelling Scheme for

Refrigerating Appliances

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Energy Efficiency EMSD

Electrical and Mechanical Services Department
3 Kai Shing Street, Kowloon, Hong Kong
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Preface

The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances (cited as "the Scheme") was revised to cover the types of refrigerating appliances not regulated under the Energy Efficiency (Labelling of Products) Ordinance (cited as "the Ordinance") since November 2009. Basically, it includes refrigerating appliances with a rated total storage volume exceeding 500 litres, which are not covered by the Ordinance.

For the scope of the refrigerating appliances to be covered by the Scheme, please refer to section 3 of the Scheme for details.

For the refrigerating appliances under the Ordinance, please refer to the requirement under the Ordinance.

The importers or local manufacturers of the refrigerating appliances are welcome and encouraged to participate in the Scheme if their products fall into the classification of the Scheme.

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1. Purpose

1.1 This set of document is intended to give a general description to the Hong Kong Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances. For refrigerating appliances regulated under the Energy Efficiency (Labelling of Products) Ordinance, please refer to the Ordinance.

2. Background

2.1 The Energy Efficiency Labelling Scheme (EELS) is an energy conservation initiative that the Government of the Hong Kong Special Administrative Region has adopted. Under the EELS, some common types of household electrical / gas appliances and office equipment will incorporate an energy label that serves to inform consumers of the product's energy consumption and efficiency. Consumers should then be able to take those factors into account in making their purchasing decision.

2.2 The concept of EELS has been implemented in several forms and in different stages of development in many countries. The EELS generally aims to achieve:

- greater public awareness of energy conservation and environmental improvement needs;
- provision of readily available, pre-purchase information on energy consumption and efficiency data to enable ordinary consumers to select more energy efficient products;
- stimulation to the manufactures/market for phasing out less energy efficient models; and
- motivation of the actual energy savings behaviours and environmental improvements.

2.3 Hong Kong aims at achieving the above objectives. The Hong Kong Voluntary Energy Efficiency Labelling Scheme now covers twenty-two types of household electrical / gas appliances and office equipment. Amongst them, thirteen types are electrical appliances, seven types are office equipment, and two types are gas appliances.

3. Scope

3.1 The Scheme will only apply to the manufacturers and importers (i.e. local agents, retailers and the related parties) who are interested to or have participated in the Scheme.

3.2 The Scheme commenced on 15 June 1995. It is further revised on 1 January 2021. The existing and newly registered labels will remain valid till 31 December 2022. By then, renew of the application may be required subject to the review of the Scheme.

Remarks: The scheme will be under review with respect to the latest international/ national standards.

3.3 The Scheme applies to refrigerating appliances which have a rated total storage volume exceeding 500 litres.

3.4 The scope of the Scheme covers all new refrigerating appliances, imported to or manufactured in Hong Kong with effect from the date that is declared by the participant but does not cover the second-hand products, products already in use, under trans-shipment or manufactured for export, etc.

3.5 The Scheme is operated as a 'Grading Type' labelling system. All participating refrigerating appliances will be registered under this scheme provided that they have met the testing requirement specified in the Scheme.

4. Definitions

Unless otherwise specified, the following definitions shall apply throughout this document:

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.

authority	means the Electrical and Mechanical Services Department of the Hong Kong Special Administrative Region.
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.
Director	means the Director of Electrical and Mechanical Services, the Government of Hong Kong Special Administrative Region.
food freezer	means a refrigerating appliance having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of -18 °C, and which is also suitable for the storage of frozen food under three-star storage conditions.
food freezer compartment	means a comparting suitable for freezing foodstuffs from ambient temperature down to -18°C, 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 Section 5 of the Scheme.
Government	means the Government of the Hong Kong Special Administrative Region.
ice-making compartment	means a compartment intended specifically for the freezing and storage of water ice-cubes.
inspecting officer	means the officer authorized by the Director to carry out inspection on refrigerating appliances.

IEC	means the International Electrotechnical Commission.
ISO	means the International Organization for Standardization.
label	means the energy label as described in section 9
low temperature compartment	means a compartment which may be either an ice-making compartment or a frozen food storage compartment.
mains electricity	means the electricity that is supplied in Hong Kong at a voltage of 380/220 V and a frequency of 50 Hz
participant	means the manufacturers, importers or the retailers of refrigerating appliance participating in the Scheme.
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 Scheme.
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 Scheme.
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 Scheme.
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 Scheme.
recognized laboratory	means a laboratory that compiles with the requirements as stated in section 10 and is acceptable to the Authority for carrying out tests and issuing test reports on refrigerating appliances.
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.
Scheme	means the Hong Kong Voluntary Energy Efficiency Labelling Scheme for refrigerating appliances.
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 compartments(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 section 5, 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 section 5, 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 section 5, is not warmer than –18 ^{o}C.
"4-star" freezer	means a three-star storage 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.

5. Classification of Refrigerating Appliance

Basic Classification

5.1 All refrigerating appliances in the Scheme are classified as below –

(a) Climate Class

Performance-wise the refrigerating appliance should be able to operate in extreme ambient temperatures of Hong Kong. Hence the classification used in the Scheme follows the requirements of subtropical climate class 'ST' of the IEC62552 standard as shown in Table 1.

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

Table 1 Climate Class

Class	Symbol	Ambient temperature range (°C) *Note*
		IEC 62552 *Note*
Subtropical	ST	+16 to +38

Note : IEC 62552 "Copyright © 2007 IEC Geneva, Switzerland.www.iec.ch"

(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 are stipulated in Table 2.

Table 2 Storage compartment temperature

(values in °C)

	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	$0<t_{1m}, t_{2m}, t_{3m} \leq +8$	≤+4	≤-6	≤-12	≤-18	$+8 \leq t_{cm} \leq +14$	$-2 \leq t_{cc} \leq +3$
Permitted deviations during defrost cycle	$0<t_{1m}, t_{2m}, t_{3m} \leq +8$	≤+4	≤-6	≤-9	≤-15	$+8 \leq t_{cm} \leq +14$	$-2 \leq t_{cc} \leq +3$

(IEC 62552 "Copyright © 2007 IEC Geneva, Switzerland.www.iec.ch")

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 denote the mean temperatures of frozen food storage compartments respectively.*

(c) Freezing Capacity

The refrigerating appliance freezing capacity is also a parameter for "Star" rating classification consideration. Accurate and clear indication of the freezing capacity of a food freezer in terms of the mass of food in kilograms that can be frozen to -18 °C in 24 hours is also needed.

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.

Overall Classification

5.2 All refrigerating appliances shall be classified in accordance with Table 3, which also incorporates the various parameters involved in the classification –

Table 3 Overall Classifications

Types	Category No.	Functional Classification		
		Fresh food compartment temp. in °C	Frozen food compartment temp. in °C	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.

6. Test Methodology and Standard

Test Required to be Carried Out

6.1 The tests specified in this section are required to be carried out, in accordance with IEC 62552, 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 shall contain the results of these tests –

(a) Measurement of storage temperatures of compartments;

(b) Measurements of storage volumes of compartments;

(c) Energy consumption test; and

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

The refrigerating appliance shall be tested at a voltage and frequency of mains electricity in Hong Kong with tolerances as specified in the relevant standard. An outline of the test conditions, and general methodology are provided in Annex 1.

Measurement of Energy Consumption

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

(a) IEC 62552 or;

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

The specified international standard 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.

Calculation of Adjusted Volume

6.3 The refrigerating appliance storage volumes of the different compartments in litres shall be measured in accordance with the standard specified in clause 6.2 of the Scheme. 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

Ω = 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 4.

Table 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 Annex 2

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 frozen food compartment is $T_i = T_{ffc} = -18$ °C, and temperature of a fresh food compartment is $T_r = 5$ °C,

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

$$V_{adj} = V_r + 2.15 \times V_{ffc}$$ *[See Equation 6 in Table 4]*

Energy Efficiency Definition of Refrigerating Appliances

6.4 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 storage 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.

6.5 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.

6.6 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)

Average Appliance Energy Consumption

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

6.8 The Average Annual Energy Consumption of a refrigerating appliance shall be determined in accordance with Table 5.

Table 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*(V_{adj} x 0.777 + 303) (Note)	18
Category 7	Chest freezer: V_{adj} x 0.446 + 181 Upright freezer: V_{adj} x 0.472 + 286	19 20
Category 8	Chest freezer: 1.35*(V_{adj} x 0.446 + 181) (Note) Upright freezer: 1.35*(V_{adj} x 0.472 + 286) (Note)	21 22

(**Note** : The figure 1.35 is the correction factor for no-frost models.)

7. Energy Efficiency Grading

Energy Consumption Index (I_ε)

7.1 The energy consumption index (I_ε) 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 equations in clause 6.7 and clause 6.8 of the Scheme). The indices are expressed in percentages. Thus, within a category, a refrigerating appliance with a lower energy consumption index (i.e. lower percentage) consumes less energy than a refrigerating appliance with a higher energy consumption index (i.e. 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 5.

Refrigerating Appliance Energy Efficiency Grading

7.2 The energy efficiency grading of a refrigerating appliance shall be determined as shown in Table 6, with Grade 1 having the best performance and Grade 5 having the worst performance.

Table 6 - Derivation of energy efficiency grades

Energy Consumption Index : I_ε (%)	Energy Efficiency Grade
$I_\varepsilon \leq 35$	1
$35 < I_\varepsilon \leq 44$	2
$44 < I_\varepsilon \leq 55$	3
$55 < I_\varepsilon \leq 69$	4
$69 < I_\varepsilon$	5

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

7.4 A flow chart for developing the energy efficiency grading of a refrigerating appliance is shown in Annex 3.

8. Performance Requirements

Performance Requirement

8.1 In the test report submitted to the Director under clause 11.4, the results of the tests carried out in accordance with IEC 62552, 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 Table 2. (Note: This measurement test shall not 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℃and which is also suitable for the storage of frozen food under three-star storage conditions.

8.2 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 8.1 of the Scheme. The rated total storage volume shall be the sum of the rated storage volumes of all the compartments of the refrigerating appliance.

Safety Requirements

8.3 In addition to the energy efficiency performance requirements, all refrigerating appliances shall comply with the Electrical Products (Safety) Regulation, Chapter 406G of the Laws of Hong Kong, and the safety standards specified under the Regulation, and all other legislation concerning the safety of the refrigerating appliance, e.g. the Gas Safety Ordinance and its subsidiary legislations, as appropriate.

Number of Samples to be Tested

8.4 For submission of product information of a model under clause 11.4 of the Scheme, a test report on one sample of the model shall be submitted.

9. Energy Label

9.1 The specification of the energy label for refrigerating appliance is shown in Annex 4. 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 Annex 4.

9.2 (a) Subject to clause 9.2(c), the energy label is to be attached or affixed to a top front door or at a prominent position of the refrigerating appliance and is to be clearly visible. The participant should ensure that the label appears on every registered refrigerating appliance on display, sale or hire.

(b) For the avoidance of doubt, if only part of the refrigerating appliance is being exhibited, the energy label is to be attached or affixed to a prominent position of that part and is to be clearly visible.

(c) The energy label may be attached to the refrigerating appliance or its packaging in a manner specified by the Director where the Director has approved its being so attached.

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 Annex 4 or otherwise approved by the Director. A trim or die cut margin of up to 2 mm around the energy label is acceptable.

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

9.5 The energy label should be printed in both Chinese and English. Soft copy of the energy label can be obtained from Energy Efficiency Office, Electrical and Mechanical Services Department.

10. Testing Facilities, Laboratories & Accreditation Bodies

10.1 The testing shall be carried out either by independent test institutes or by the manufacturers or by the importers themselves at their own test facilities. The Authority will accept the results and certificates issued by the test laboratory, which fulfills one of the following criteria as specified in clauses 10.2, 10.3 or 10.4.

10.2 The laboratory is accredited by the Hong Kong Accreditation Service (HKAS) for the relevant test under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or a scheme with which HKAS has concluded a mutual recognition agreement (MRA) [#], and the results are issued in a test report or certificate bearing the accreditation mark.

10.3 The Authority will also consider the following –

(a) Self-certification by original manufacturers that the operations of their in-house laboratories satisfy the requirements of ISO/IEC 17025; and

(b) The manufacturers are currently operating according to a recognized international quality system (such as ISO 9001); and

(c) The manufacturer's in-house laboratories had successful carried out tests on refrigerating appliances based on IEC 62552, and these tests had been evaluated and certified by third party internationally recognised certification organisations.

10.4 The Authority will also consider the test results issued by a laboratory which is accredited by HKAS (or is under accreditation scheme operated by a laboratory accreditation body with which HKAS has concluded MRA) for the relevant tests on electrical and mechanical appliances other than the tests based on the technical standards stipulated in the Scheme; if the laboratory can demonstrate their capability of carrying out tests on refrigerating appliances in accordance with IEC 62552.

[#] *HKAS has concluded mutual recognition arrangements with overseas accreditation bodies for testing laboratory accreditation. The list of mutual recognition arrangement partners may change from time to time and the up-to-date list is available from the HKAS website of www.info.gov.hk/itc/hkas. Partners to these arrangements recognise the accreditations granted by one another as equivalent.*

Laboratory Accreditation

10.5 Government takes cognizance of the need to ensure acceptable and compatible quality standards of testing laboratories, and considers that they need to be periodically accredited by some independent bodies.

10.6 The criteria of accreditation should be based on ISO/IEC 17025 and the certification body should operate in accordance with ISO/IEC17011.

10.7 The Authority will recognize the accreditation granted by the HKAS under the HOKLAS and by overseas accreditation bodies with which HKAS has concluded MRA. For the accreditation by other certification bodies, the Authority will consider on a case-by-case basis.

Energy Efficiency Certification Service

10.8 An increasing number of countries now accept, as proof of product conformance, energy efficiency certification services provided by the organisation that has been accredited as a certification body. In accordance with this trend, the Authority will also consider test results that have been evaluated and certified according to the respective IEC standards of the Scheme by reputable certification organisations.

11. Registration and Participation

Registration Procedures

11.1 All manufacturers, importers and the other parties involved in the refrigerating appliance distribution network are welcome and encouraged to participate in the Scheme. The Authority will send invitation to those known manufacturers and importers. However, no matter whether invited or not, any interested parties may submit their applications for the registration.

11.2 The proforma letter of invitation is shown in Annex 5.

11.3 Applicant should submit formal application to

Chief Engineer/Energy Efficiency A
Energy Efficiency Office
Electrical and Mechanical Services Department
3 Kai Shing Street, Kowloon
Hong Kong

by means of an application letter through mail, facsimile or electronic mail. In order to ensure effective implementation of the Scheme, the applicant must commit himself to fully comply with the duties, responsibilities and obligations set out in the Scheme. The proforma letter of application as shown in Annex 6 details the aforesaid obligations and should be used for application. To facilitate the application process, the application form can be downloaded from EMSD website.

Information/Documents to be Submitted for Registration

11.4 Each make and model of a refrigerating appliance participating in the Scheme should be provided with a test report issued by a recognized laboratory. The test report should contain energy consumption tests and performance test results. The details of the technical information to be submitted together with the application are listed as follows: -

a) Information on the company

Name, Address, Telephone number, Fax number, E-mail address, Contact person, Importer, Distributor, etc.

b) Product to apply for participating in the Scheme:

Name of products, types, makes, models, countries of origin

c) The parties which will be responsible for making and fixing the Energy Labels;

d) Commencement date to affix Energy Label on refrigerating appliance

Year_____, Month_____

e) Completion all the Information stated in the Energy Label for each product including the following:

Brand & Model (Chinese and English)

Refrigerating Appliance category

Frozen food storage compartment temperature symbol (star rating)

Freezing capacity

Annual energy consumption

Energy efficiency grade

Storage volume of fresh food compartment

Storage volume of frozen food compartment

f) Supporting Technical Information and Calculations

Test reports: -

Annual energy consumption tests

Freezing capacity tests

Performance tests

Calculations:-

Storage volume of fresh food compartment

Storage volume of frozen food compartment

Adjusted volume

Energy consumption index

Energy efficiency grading

g) Miscellaneous Technical Information:

Product information catalogue

Information of compressor and refrigerant

Defrost device

Others

h) Certificate of Safety Compliance prescribed by the "Electrical Products (Safety) Regulation".

The above list of information can also be found in Annex 7, Information to be submitted to Energy Efficiency Office.

11.5 Company's name and chop should be stamped on all the documents provided. All photocopy test reports submitted to the Authority shall be certified true copy by appropriate organization.

Acceptance of Registration

11.6 On receipt of the application, the Authority will process the application and verify whether the refrigerating appliance to be registered falls into the appropriate refrigerating appliance category, and the energy efficiency grade is correctly obtained based on the submitted data. The accuracy of the energy consumption data and the storage volume, their inconsistencies and non-compliance will be dealt with in accordance with clause 13.2.

11.7 If the application is accepted, the participants will be notified of the result in writing within 17 working days. The participants will then be allowed to affix the label onto the 'registered' refrigerating appliances. Both manufacturer and importer of the registered refrigerating appliance should ensure that the energy label is correctly printed and affixed on the refrigerating appliance in accordance with section 9. The proforma letter of acceptance is shown in Annex 8.

11.8 If the application is rejected, the notification letter (proforma letter of rejection as shown in Annex 9) will also be given within 17 working days upon receipt of all necessary information requested.

11.9 The flow chart for registration is shown in Annex 10

Participant's Duties, Responsibilities and Obligations

11.10 The participant is obliged to:-

a) submit application and information including test results in accordance with format & procedures set out in clauses 11.4 and 11.5;

b) conduct tests via recognized laboratories and to comply with the specified test methodology and classification scheme;

c) produce and affix labels at his own costs;

d) fully inform other sales agents in his distribution network once the particular make and model of a refrigerating appliance is registered under the Scheme;

e) allow random/ad-hoc inspection to be conducted by persons authorized by the Authority on registered refrigerating appliance at his premises;

f) conduct re-test(s) at his own costs at some recognized laboratories, if non-compliance is found on his registered refrigerating appliance, or if the results of inspection suggest inaccurate energy label information being displayed. The result of re-test(s) shall reach the Authority within the prescribed period of time specified by the Authority; normally three months;

g) inform the Authority of any change in the technical information and data that were previously submitted to the Authority together with the application letter;

h) accept the fact that if registered refrigerating appliance fails to perform in accordance with the required standard performance as given in section 8 and this cannot be readily rectified, the Authority may order it be de-registered from the Scheme; andi) remove all labels from the de-registered refrigerating appliances immediately.

11.11 The details of the registered refrigerating appliances under the Scheme will be kept in a register list maintained by the Authority. The registration records will be regularly uploaded and maintained in the EMSD Internet for public and interested parties for browsing and reference.

Termination

11.12 Under circumstances of poor performance of the participant such as –

(a) (repeated) failure to fulfill the obligations set out under clause 11.10; or

(b) false, inaccurate or misleading information is given on the energy label; or

(c) in any other case where the Director is of the opinion that registration of the particular refrigerating appliance is contrary to the public interest,

the Authority may de-register the concerned refrigerating appliance from the Scheme with immediate effect by giving the participant a notice in writing. Once the refrigerating appliance is de-registered, energy label is not allowed to fix on it. However, participant will normally be given a grace period of three months to remove all labels from the de-registered refrigerating appliances.

The concerned refrigerating appliance could be de-registered even when there is no legal action taken under either the Trade Description Ordinance (Chapter 362) or the Copyright Ordinance (Chapter 528).

11.13 Participant who decides to discontinue participating in the Scheme or to withdraw any registered model from the registered refrigerating appliances list shall give at least three months' advance notice to the Authority.

12. Legal Provisions

12.1 The Scheme is a voluntary scheme. However, a participant who abuses the Scheme by giving false information on an energy label may contravene provisions of the Trade Description Ordinance (Chapter 362).

12.2 No one could take advantage of the Scheme by using the energy label on his refrigerating appliances without authorization of the Authority as that shall constitute an infringement of copyright under the Copyright Ordinance (Chapter 528).

13. Compliance, Monitoring and Inspection

Purpose

13.1 To uphold the credibility of the Scheme and to continue maintaining the confidence of the consumers, compliance check on energy labels on those refrigerating appliances participating in the Scheme are needed. Also, to avoid the non-participating parties from taking advantage of the Scheme by using unauthorized labels, suitable form of inspection shall be conducted on those refrigerating appliances which have not been registered under the Scheme.

Scope

13.2 The scope of inspection includes sample checking and testing of the following items:-

(a) whether the energy label is affixed on the registered refrigerating appliance;

(b) whether the energy label on the registered refrigerating appliance is affixed to a prominent position in accordance with clause 9.2;

(c) whether the energy label being displayed is of correct format in accordance with clause 9.2;

(d) whether the information on energy label accords with record;

(e) whether the registered refrigerated appliance complies with the energy consumption and the performance requirements;

(f) whether the data submitted by the participants are correct by random re-testing; and

(g) whether the unregistered refrigerating appliances display unauthorized energy labels.

13.3 The participants will be requested to take immediate remedial action and report of follow-up action taken if non-compliance is found on their refrigerating appliances.

13.4 For a registered refrigerating appliance which is found with inaccurate energy performance data (i.e. discrepancy between the registration data record and the test result is more than 10%) on the energy label during random checking, the Authority may request the participant to conduct a separate energy consumption test at his own cost, in accordance with the test methodology as stated in section 6, in one of the testing laboratories agreed by the Authority. In case the energy grading of the refrigerating appliance is found 2 level or more lower than the declared energy grading, the test should be carried out further on at least three similar refrigerating appliances. The energy grading from the average of these three refrigerating appliances should be the same as the declared grading level. Otherwise, the Authority will require the participant to take appropriate remedial action including replacing an energy label with correct grading value for the registered refrigerating appliance.

Inspecting Officers

13.5 The Authority will authorize inspecting officers to carry out compliance monitoring and inspection on refrigerating appliances. The officers will carry proper identification cards which will be produced upon request during their inspection operations. However, the officer will not inform the participants in advance of their intended inspection operation.

13.6 It is the participants' obligation to allow the inspecting officers to gain access to their premises to carry out inspection.

Mode of Inspection

13.7 Inspections will be carried out on registered refrigerating appliances under the Scheme on random basis. Based on the record of the registration, random inspection programmes will be developed.

13.8 In addition to the random inspections, the inspecting officers will carry out ad-hoc inspections in response to complaints. The items to be inspected in such a case will depend upon the nature of complaint and may include all types of inspection as stated in clause 13.2.

13.9 Inspections will normally be carried at the retail outlets and refrigerating appliances showrooms. Where necessary, inspection will also be done at warehouses.

13.10 The inspection results will be properly recorded for future analysis as well as on evaluation of the effectiveness of the Scheme.

Compliance

13.11 During the compliance monitoring testing carried out by the Director, a listed model of refrigerating appliance will be accepted as conformance if the test results of a single sample of the listed model meet the following criteria :

(a) The tested storage temperatures of the compartments complying with the requirements of Table 2, using the testing standard specified in the test report submitted to the Director by the specified person;

(b) The tested storage volume for each of the compartments being not 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) The tested energy consumption (kWh/24h) being not greater than the rated energy consumption by more than 15%;

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

The tested freezing capacity meeting 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 tested freezing capacity being not less than the rated freezing capacity by more than 15% of the latter. For food freezer, it having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of –18℃ and which being also suitable for the storage of frozen food under three-star storage conditions; and

(e) The tested energy efficiency grade meeting either one of the following :

(i) The energy efficiency grade calculated in the compliance monitoring testing being equal to or better than the energy efficiency grade determined by the test results submitted to the Director by the specified person; or

(ii) If the energy efficiency grade calculated in the compliance monitoring testing being not equal to nor better than the energy efficiency grade determined by the test results submitted to the Director, the tested energy consumption index calculated in the compliance monitoring testing being not greater than 115% of the measured energy consumption index calculated by the test results submitted to the Director, and in any cases not greater than the highest energy consumption index allowed in the next lower energy efficiency grade.

13.12 The Director may remove from the record the reference number of a listed model of refrigerating appliance, if he has reasonable grounds to believe that the refrigerating appliance does not conform with the specified information or a specified document, or their updates if any, submitted to the Director. The specified person may provide explanation on the failure of a product to pass the compliance monitoring testing stipulated in clause 13.11 above and apply for further testing of the concerned model for the Director's consideration.

13.13 If further testing is approved to be carried out, three samples of the same model shall be tested at the specified person's own costs. A listed model of refrigerating appliance will be accepted as conformance if the results of further testing meet the following criteria:

(a) The tested storage temperatures of the compartments of each sample complying with the requirements of Table 2, using the testing standard specified in the test report submitted to the Director by the specified

person;

(b) The average of the tested storage volumes for each of the compartments of all the samples being not 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) The tested energy consumption (kWh/24h) of each sample being not greater than the rated energy consumption by more than 15%;

(d) (For only food freezer or refrigerating appliance having food freezer compartment)
The average of the tested freezing capacities of all the samples meeting 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 tested freezing capacity of each sample being not less than the rated freezing capacity by more than 15% of the latter. For food freezer, it having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of –18℃ and which being also suitable for the storage of frozen food under three-star storage conditions; and

(e) The tested energy efficiency grade meeting either one of the following:

  (i) The energy efficiency grade of each sample calculated in the further testing being equal to or better than the energy efficiency grade determined by the test results submitted to the Director by the specified person; or

  (ii) If the energy efficiency grade of any sample calculated in the further testing being not equal to nor better than the energy efficiency grade determined by the test results submitted to the Director, the tested energy consumption index of that sample calculated in the further testing being not greater than 115% of the measured energy consumption index calculated by the test results submitted to the Director, and in any cases not greater than the highest energy consumption index allowed in the next lower energy efficiency grade.

(Remark : The specified person can choose to accept the results of further testing undertaken on fewer than three samples if the results of each sample subsequently tested also do not meet the acceptance criteria as stated above.)

14. Complaints and Appeal

14.1 The Authority will be responsible for dealing with the complaints from participant and other parties against matters related to the Scheme.

Complaints Handling Procedures

14.2 The Director shall ensure that complaints are properly recorded and handled without undue delay.

14.3 The Authority shall carry out preliminary investigation on complaints and reply to the complainants within a reasonable time. For complaints that require site inspection and laboratory test, the complainant shall be notified through an interim reply.

14.4 The Authority shall inform the complainant of the results or decisions made on the complaint.

Appeal Procedures

14.5 A participant who feels aggrieved by the decision or action given by the Authority according to section 13 may appeal to the Director in writing stating the reason for the appeal.

14.6 The Director may decide to suspend the decision or action given by the Authority from the day on which the appeal is made until such appeal is disposed of, withdrawn or abandoned unless such suspension would, in the opinion of the Director, be contrary to public interest.

14.7 The Director may by notice to the appellant require that appellant to attend meeting with him or his representative, provide documents and give evidence relevant to the appeal.

14.8 The Director shall notify the appellant of his decision and the reasons for it. The decision will be final and binding.

15. Maintenance of Scheme

15.1 To ensure that the Scheme can continue to operate effectively and efficiently after its introduction, a proper system of maintenance is needed.

15.2 The maintenance system consists essentially of -

(a) Continuous updating of the following relevant information of the participants in the Scheme -

i. Details of the registered refrigerating appliances such as registration number, date of registration or de-registration if it occurs, energy consumption data, energy consumption index. performance data, make, model, category and other related information; and

ii. Details of the registered importers, manufacturers, local agents, etc.; in the distribution network such as address, date of registration or de-registration if it incurs, etc.

(b) Periodic review of the test methodology, and procedures for application of registration and compliance monitoring, etc., to bring them in line with the latest needs of the manufacturers, importers and retailers, etc.

(c) Continuous evaluation of the effectiveness of the Scheme and assessment of what changes are necessary.

16. Future Development

16.1 It is hoped that following the implementation of the Scheme, the market will phase out models of low efficiency appliances and public awareness of using energy efficient products will be much improved.

16.2 To further facilitate the public in choosing energy efficient appliances and raise public awareness on energy saving, the Government has introduced a mandatory Energy Efficiency Labelling Scheme (EELS) through the Energy Efficiency (Labelling of Products) Ordinance.

16.3 Under the mandatory EELS, energy labels are required to be shown on prescribed products for supply in Hong Kong to inform consumers of their energy efficiency performance. Eight types of prescribed products covered in the mandatory EELS are room air conditioners, refrigerating appliances compact fluorescent lamps, washing machines, dehumidifiers, storage type electric water heaters, televisions and induction cookers.

Methodology for Measurement of Energy Consumption

1. Introduction

1.1 The purpose of this document is to describe the proposed methodology for measuring energy consumption and energy efficiency standard of refrigerating appliances in Hong Kong.

2. Basic Principles

2.1 The basic principles are to ensure meaningful like-to-like comparison among refrigerating appliances be made possible, and to enable consumers be given the right information of choice. Hence the stated information (i.e. energy consumption and efficiency standard) on the energy label must be based on some common set of criteria and data on performance and operating requirements. In other words, refrigerating appliance under measurement or comparison must be based on some common and pre-determined test conditions and procedures, while giving acceptable performance.

3. Test Methodology

3.1 Test Standards

The test standards of measuring energy consumption for refrigerating appliances are based on IEC 62552 or other equivalent international standards approved by the Director. For detailed requirements and procedural descriptions one should refer to the respective standards.

3.2 Conditions for Measurement of Energy Consumption

The determination of energy consumption shall be carried out under the specified test room conditions, test load and test procedures as specified by the respective IEC 62552 standards or other equivalent international standards approved by the Director, while achieving the required performance requirements and figures.

3.2.1 The test room conditions

The tests shall be carried out under the following test room conditions –

(a) Ambient Temperature

The ambient room temperature shall be +25 °C controlled to the tolerance of ± 0.5 °C.

(b) Relative Humidity

The relative humidity shall be kept within the range from 45% to 75%.

(c) Power Supply

The refrigerating appliance shall be tested at the voltage of 380/220 V ± 1% and frequency of 50 Hz ± 1 %.

(d) Installation of Appliance being tested

The refrigerating appliance being tested shall be installed, placed or shielded as to conform to the requirements stated in the relevant clauses of the respective IEC62552 standards or other equivalent international standards approved by the Director.

3.2.2 Test Load

The test load shall be in the form of rectangular packs of dimensions and mass as follows:

Dimensions (mm)	Mass (g)
25 x 50 x 100	125
50 x 100 x 100	500
50 x 100 x 200	1000

Tolerances shall be as follows:

- Linear dimensions ± l.5 mm for 25 mm and 50 mm;
- ± 3.0 mm for l00 mm and 200 mm;
- Mass ±2%

The load packages shall be of composition as stated in the respective IEC standards or other equivalent international standards approved by the Director.

3.2.3 Preparation of the Appliance

The refrigerating appliance shall be installed and loaded as for the storage temperature test. If, however, anti-condensation heaters are provided which can be switched on and off by the user but are not necessary to withstand the water vapour condensation test, they shall not be switched on.

The measurement of energy consumption shall be carried out under storage condition with all compartments simultaneously being in operation.

The energy consumption is that which is obtained when all the storage temperature conditions in accordance with the specified requirements are met simultaneously, and which gives the lowest energy consumption.

3.2.4 Test Instrumentation

Temperature measuring instruments shall be accurate to within ± 0.3 °C. The accuracy of the relative humidity measurement shall be such that the result, expressed as the dew point, is accurate to within ± 0.3 °C. Watt-hour meters shall be readable to 0.01 kWh and be accurate to within ±1%.

3.2.5 Test Period

The test period shall start at least 24 hrs after stable operating conditions have been attained. The test period shall start at the beginning of an operating cycle; shall be at least 24h duration and shall comprise a whole number of operating cycles. If an operating cycle starts but is not completed during the 24h period, the test shall continue until the end of the operating cycle.

3.2.6 Measurement of Energy Consumption

The energy consumption value measured in accordance with the above paragraphs while satisfying the performance requirements stated in clause 3.2.7 shall be expressed in kilowatt-hour per 24h (kWh/24h) to two decimal places. The value so measured on the appliance shall not be greater than 15% of the energy consumption declared by the manufacturer.

3.2.7 Performance Requirements

The refrigerating appliance shall be tested for conformity with the performance requirements in accordance with the relevant clauses of IEC 62552 or other equivalent international standards approved by the Director as follows:

a) Measurement of temperature of fresh food storage compartment, chill compartment and cellar compartment, if applicable; and

b) Measurement of temperature of freezer compartments and frozen food storage compartment; and

c) Temperature rise test; and

d) Freezing test, if applicable; and

e) Ice making test, if applicable.

Example for Calculating the Energy Efficiency Grade for Refrigerating Appliance

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, 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	Ω_r = 1.00	$V_r \times \Omega_r$ = 174
Frozen food storage (V_{ffc})	100	Ω_{ffc} = 2.15	$V_{ffc} \times \Omega_{ffc}$ = 215
Chill storage (V_c)	67	Ω_c = 1.25	$V_c \times \Omega_c$ = 83.75
Total:	341		$\Sigma V \times \Omega$ = 472.75

Annual Energy Consumption : 280 kWh/year

The adjusted volumes for the refrigerating appliance are calculated according to the equations 1, 2 and 11 in clause 6.3.

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

From the Table 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

$$\text{Energy Consumption Index } (I\varepsilon) = \frac{\text{Annual Energy Consumption}}{\text{Average Annual Energy Consumption}}$$

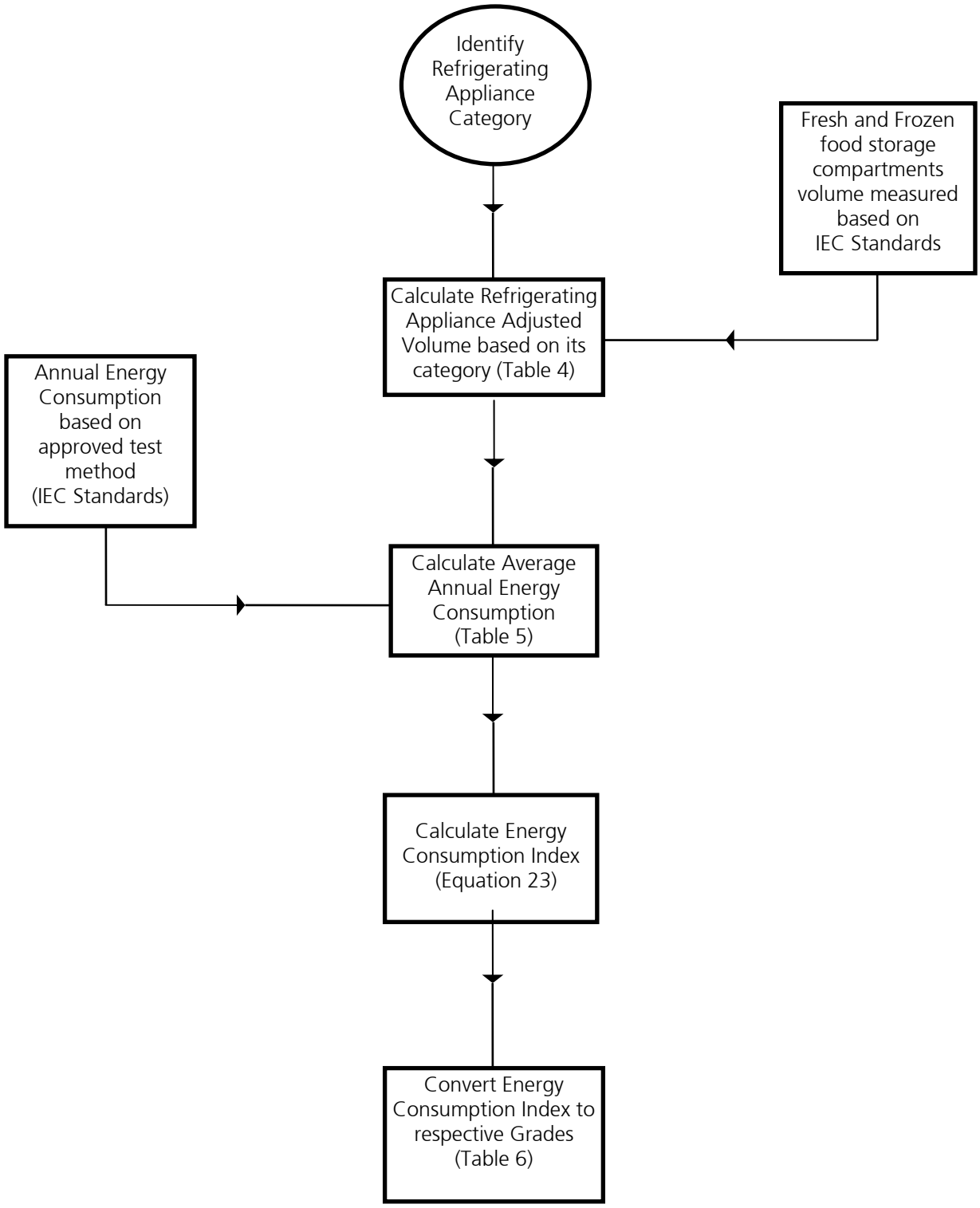
$$I\varepsilon = 280 / 905 = 30.9\ \%$$

$$I\varepsilon < 35\ \%$$

The energy consumption index (Iε) of the refrigerating appliance is calculated as 30.9% which is less than 35%. According to Table 6 in clause 7.2, it is rated as **Grade 1** refrigerating appliance.

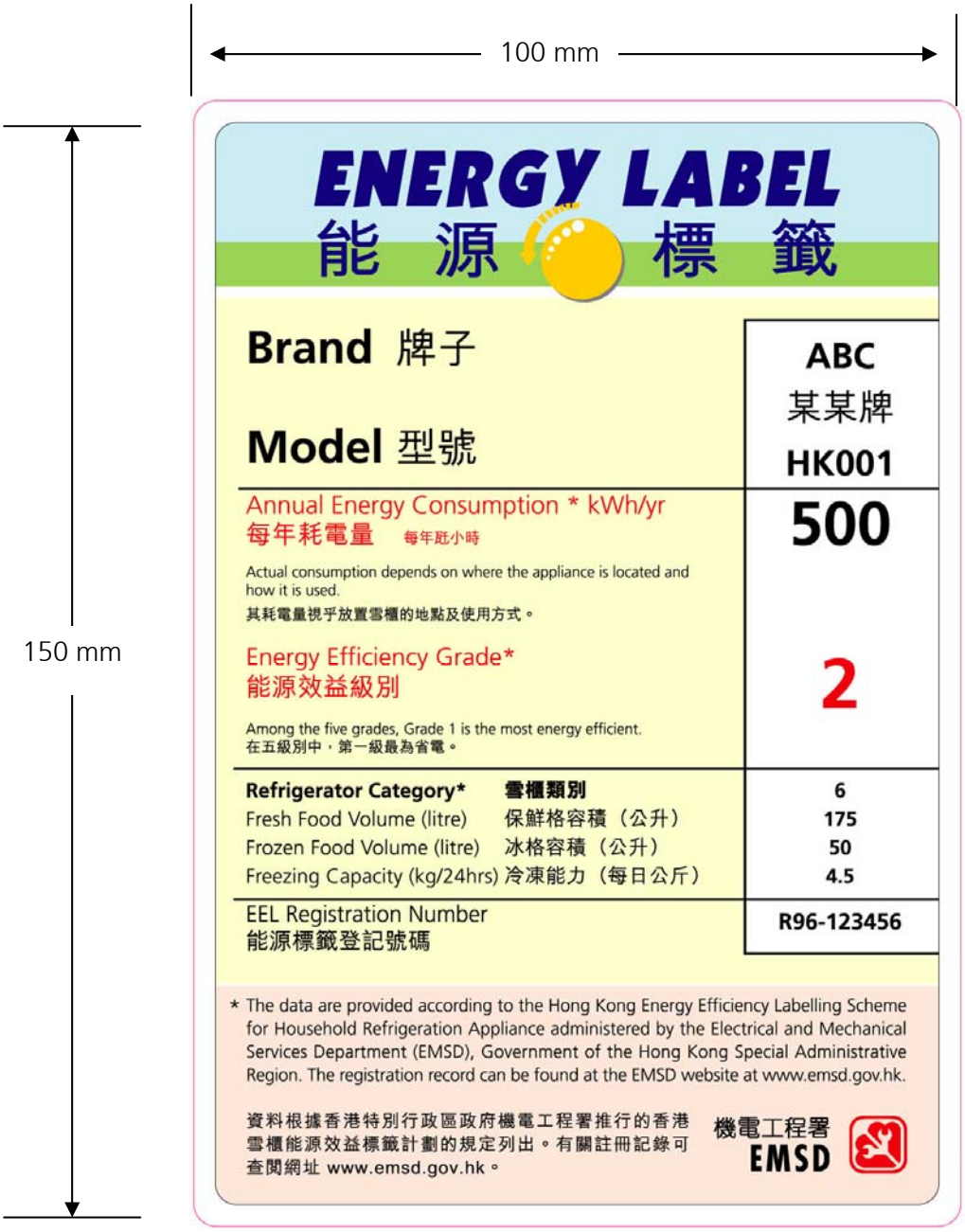
The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

Flow Chart For Developing the Energy Efficiency Grade



The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

Energy Label Format



Soft copy of this label can be obtained from Energy Efficiency Office, Electrical and Mechanical Services Department.

Proforma Letter of Invitation

Our ref. ( ) EMSD/EEO/LB/02
Your ref.

Tel.
Fax.

Date

「 Name and Address of
Manufacturers/Importers/Agents 」

Dear Sir/Madam,

Invitation of Application for Registration to Participate in Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

Having gone through the necessary consultations and duly considered the views from various concerned parties, the government has decided to introduce a voluntary energy efficiency labelling scheme for refrigerating appliances to Hong Kong with effect from (_____). The details of the Scheme❶ have been finalized and I enclose herewith a guide of the Scheme for your reference.

Being one of the major refrigerating appliances manufacturers / importers / agents❷ in Hong Kong, you are invited to participate in the Scheme so as to take part in promoting public awareness in energy conservation and environmental improvement to Hong Kong. If you are interested to participate in the scheme, please apply in accordance with the proforma letter of application (Annex 6) and submit details including technical information in accordance with the attached Annex 7 to the 'Chief Engineer / Energy Efficiency A' at the following address.

Energy Efficiency Office
Electrical and Mechanical Services Department
3 Kai Shing Street, Kowloon
Hong Kong

Please be reminded to submit accurate test data to support your application. Under this Scheme, routine compliance monitoring and checking will be performed and if a registered refrigerating appliance is found to be non-compliant, we may consider deregistering the

refrigerating appliances from the Scheme.

Should you need further clarification or information, you are most welcome to contact the undersigned or Mr _____, at the telephone number _____.

Yours faithfully,

for Director of Electrical & Mechanical Services

____

(Note : ❶ 'Scheme' means 'The Voluntary Energy Efficiency Labelling Scheme for refrigerating appliances '

❷ delete as appropriate)

Proforma Letter of Application

Your ref. ( ) EMSD/EEO/LB/02
Our ref.

Tel.

Date

Chief Engineer/Energy Efficiency A
Electrical & Mechanical Services Department
3 Kai Shing Street, Kowloon
Hong Kong

Dear Sir/Madam,

Application for Registration to Participate in
Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

Our company is the (manufacturer/importer/agent*) of_____ in Hong Kong. We support the introduction the labelling scheme to Hong Kong and would like to be one of the participants in the Scheme to promote energy efficiency.

I understand fully the obligations and duties stated in the Scheme and will comply with all relevant requirements, in particular those specified below:

i) conduct tests via recognized laboratories and to comply with the specified test standards;
ii) produce and affix specified labels at my own costs;
iii) allow random/ad-hoc inspection to be conducted by persons authorized by the issuing Authority on registered refrigerating appliance at my premises;
iv) conduct re-test(s) at my own costs at some recognized laboratories, if the results of inspection suggest inaccurate energy label information being displayed. The result of re-test(s) shall reach the Authority within the prescribed period time specified by the Authority;
v) inform the Authority of any change in the technical information and data that were previously submitted to the Authority together with the application letter; and
vi) accept the fact that if refrigerating appliance fails to perform in accordance with the required energy efficiency standards and performance as given in Section 6 and this cannot be readily rectified, the Authority may order it be de-registered from the Scheme.

The details of information of those refrigerating appliances which we intend to register with the Authority are shown in the attached document (Annex 7), and are submitted herewith for your vetting.

Yours faithfully,

(Manufacturer/Importer/Agent's Name and Company Chop)

_____

* *delete as appropriate*

Information to be submitted to Energy Efficiency Office

1. Information on the Company:

   Name, Address, Telephone number, Fax, Email address, Contact person, Importer, Distributor, etc.

   2. Product to apply for participating in the Scheme:Name of products, types, make, model references, countries of origin

3. Parties will be responsible for making and fixing the Energy Label.

4. Commencement date to affix Energy Labels on refrigerating appliance package Year _____, Month _____

5. Detailed test reports providing at least the following relevant technical data for the participating refrigerating appliances:

   Brand & Model
   Refrigerating Appliance category
   Frozen food storage temperature symbol (star rating)
   Freezing capacity
   Annual energy consumption
   Energy efficiency grade
   Fresh food storage volume
   Frozen food storage volume

6. Supporting Technical Information and Calculations:-

   Test reports: -

   Annual energy consumption test
   Freezing capacity test
   Performance tests

   Calculations:-

   Fresh food storage volume
   Frozen food storage volume
   Adjusted volume
   Energy consumption index
   Energy efficiency grading

7. Miscellaneous Technical Information:

Product information catalogue
Information of compressor and refrigerant
Defrost device
Others

8. Certificate of Safety Compliance prescribed by the Electrical Products (Safety) Regulation of HKSAR for the concerned refrigerating appliances in the application.

Note: Company's name and chop should be stamped on the all documents provided.
All test reports submitted to the office should be certified true copy by appropriate organization.

Proforma Letter of Acceptance

Your ref.
Our ref. ( ) EMSD/EEO/LB/02

Tel:
Fax:
Date

⌜
Manufacturers/Importers/Agents
⌟

Dear Sir/Madam,

Acceptance of Application for Registration to Participate in
Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

With reference to your letter of ref._____ dated _____, I am pleased to inform you that your application to participate in the captioned scheme has been accepted.

I enclose herewith the registration certificates of Refrigerating Appliances registered.

The registered Refrigerating Appliances are as follows:

Brand/Make/Model	Registration No.	Effective date
(_____)	(_____)	(_____)

You are allowed to affix a specified energy label onto each and every refrigerating appliance package registered under the scheme. The contents of the energy label should be based on the information that you have provided in your application ref._____ and dated _____.

Should you have any queries regarding the scheme, please contact this office.

Yours faithfully,

for Director of Electrical & Mechanical Services

Proforma Letter of Rejection

Our ref. ( ) EMSD/EEO/LB/02
Your ref.

Tel.
Fax.

Date

Manufacturers/Importers/Agents

Dear Sir/Madam,

Rejection of Application for Registration to Participate in
Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

With reference to your letter of application ref. _____ dated _____, I regret to inform you that your application for registration to participate in the scheme has not been accepted for the following reasons:-

1. _____,
2. _____, etc.

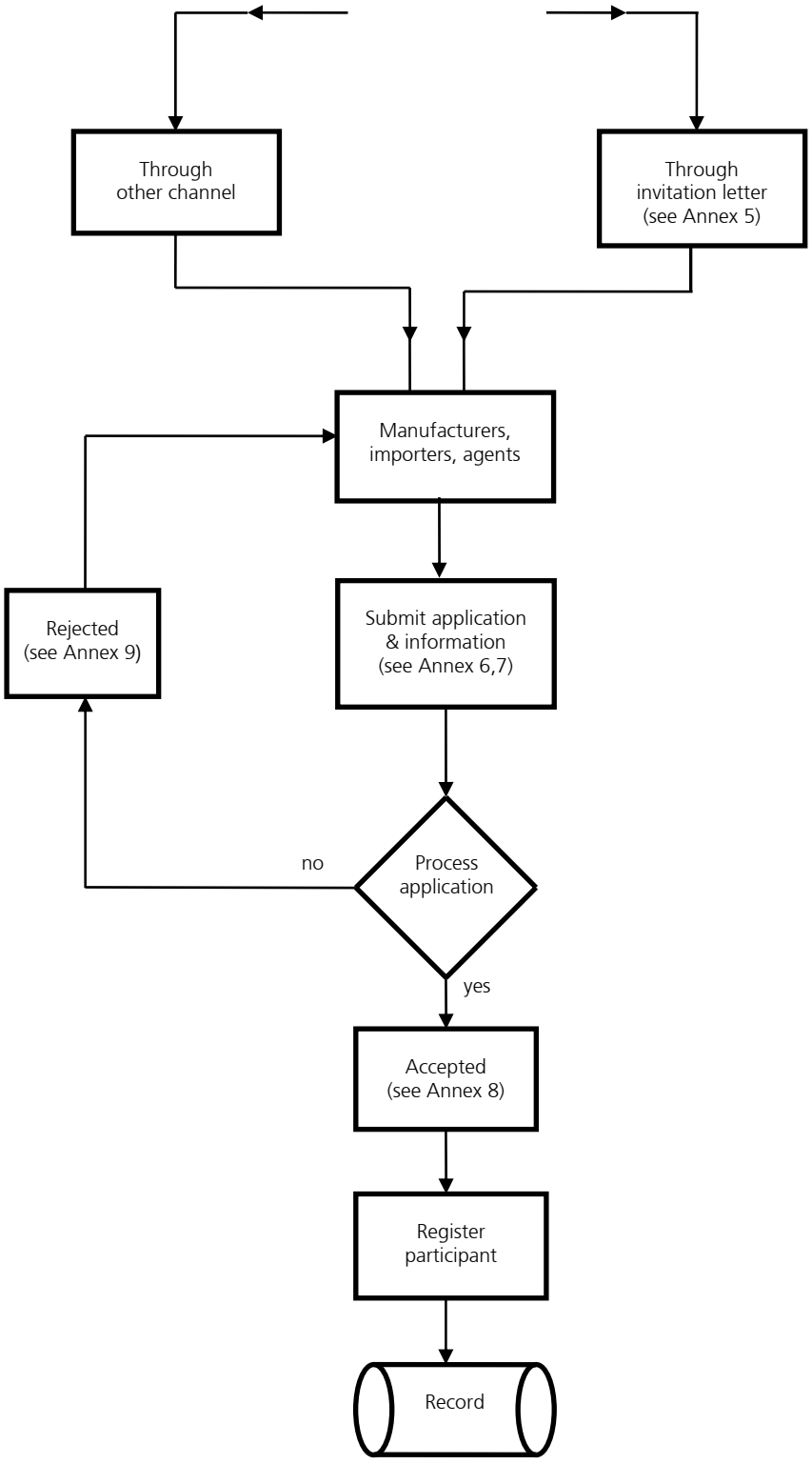
You are most welcome to submit new application again in future, when you have the necessary documents / information to support your application.

Yours faithfully,

for Director of Electrical & Mechanical Services

The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Refrigerating Appliances

Flow Chart of Registration



Summary of Equations

	Equation	Description	Page
1	$V_{adj} = \Sigma V_i \times \Omega$	Adjusted Volume General formula	9
2	$\Omega = \frac{Ta-Ti}{Ta-Tr}$	Weighting factor for compartments	9
3	$V_{adj} = V_r$	Adjusted Volume for Category 1 refrigerating appliance	9
4	$V_{adj} = V_r + 1.55 \times V_{ffc}$	Adjusted Volume for Category 2 refrigerating appliance	9
5	$V_{adj} = V_r + 1.85 \times V_{ffc}$	Adjusted Volume for Category 3 refrigerating appliance	9
6	$V_{adj} = V_r + 2.15 \times V_{ffc}$	Adjusted Volume for Category 4 refrigerating appliance	9
7	$V_{adj} = V_r + 2.15 \times V_{ffc}$	Adjusted Volume for Category 5 refrigerating appliance	9
8	$V_{adj} = V_r + 2.15 \times V_{ffc}$	Adjusted Volume for Category 6 refrigerating appliance	9
9	$V_{adj} = 2.15 \times V_{ffc}$	Adjusted Volume for Category 7 refrigerating appliance	9
10	$V_{adj} = 2.15 \times V_{ffc}$	Adjusted Volume for Category 8 refrigerating appliance	9
11	$V_{adj} = V_r \times \left(\frac{Ta-Tr}{Ta-Tr} \right) + V_{ffc} \times \left(\frac{Ta-Tffc}{Ta-Tr} \right)$		10
12	Refrigerating Appliance Energy Efficiency Ratio = $\frac{\text{Annual Energy Consumption}}{\text{Adjusted Volume}}$		11
13	$V_{adj} \times 0.233 + 245$	Average Annual Energy Consumption for Category 1 refrigerating appliance	11
14	$V_{adj} \times 0.643 + 191$	Average Annual Energy Consumption for Category 2 refrigerating appliance	11
15	$V_{adj} \times 0.450 + 245$	Average Annual Energy Consumption for Category 3 refrigerating appliance	11
16	$V_{adj} \times 0.657 + 235$	Average Annual Energy Consumption for Category 4 refrigerating appliance	11
17	$V_{adj} \times 0.777 + 303$	Average Annual Energy Consumption for Category 5 refrigerating appliance	11
18	$1.35 (V_{adj} \times 0.777 + 303)$	Average Annual Energy Consumption for Category 6 refrigerating appliance	11
19	$V_{adj} \times 0.446 + 181$	Average Annual Energy Consumption for Category 7 refrigerating appliance - Chest freezer	11
20	$V_{adj} \times 0.472 + 286$	Average Annual Energy Consumption for Category 7 refrigerating appliance - Upright freezer	11
21	$1.35 (V_{adj} \times 0.446 + 181)$	Average Annual Energy Consumption for Category 8 refrigerating appliance - Chest Freezer	11
22	$1.35 (V_{adj} \times 0.472 + 286)$	Average Annual Energy Consumption for Category 8 refrigerating appliance - Upright freezer	11
23	$I_\varepsilon = \frac{E}{E\ av} \times 100\ \%$	Energy Consumption Index for refrigerating appliances	14

Symbols used

Symbol	Quantity
Σ	Sum of
Ω	Weighting factor of difference in temperature between compartment and ambient temperature
$\leq$	Smaller or equal to
$\propto$	Proportion to
°C	Degree Celsius
%	Percentage
E	Actual Appliance Annual Energy Consumption
E_{av}	Average Annual Energy Consumption
g, kg	Gram, kilogram, mass unit
h, hrs	Hour(s), time
I_{ε}	Energy Efficiency Index
kWh	Kilowatt-hour, energy unit
l	Litre, the unit of volume
mm	Milli-meter, length unit
t_1,t_2,t_3	Recorded temperatures at the measured points in fresh food storage compartment
t_m	Mean temperature of fresh food storage compartment
t_{cm}	Recorded temperature of cellar compartment
t_{cc}	Recorded temperature of chill compartment
T_a	Test room ambient temperature which is taken as 25°C
T_{ffc}	The rated temperature in the frozen food storage compartment
T_i	The rated temperature in the individual compartment concerned
T_r	The rated temperature in the fresh food storage compartment which is taken as 5°C
V_{adj}	Adjusted volume
V_{ffc}	Volume of frozen food storage compartment
V_i	Measured storage volume of an individual compartment
V_r	Volume of fresh food storage compartment