

《強制性能源效益標籤計劃第四階段》 4th Phase of the Mandatory Energy Efficiency Labelling Scheme

講座 Seminar 2023

能源效益事務處
Energy Efficiency Office

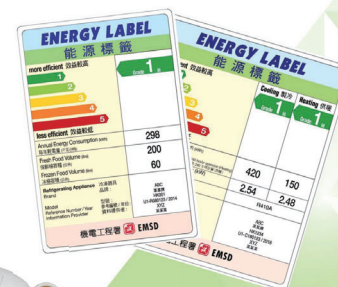


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註：本簡報所提供的資料盡量以簡易文字表達，但並非盡錄，它僅供一般參考。有關條例之詳細釋義及規定，請參閱《能源效益(產品標籤)條例》及《產品能源標籤實務守則》。

Remark: The information provided in this brief is in plain text as far as possible but not exhaustive. It is for general reference only. Please refer to the Energy Efficiency (Labelling of Products) Ordinance and the Code of Practice on Energy Labelling of Products for the detailed interpretations and requirements.



1. 背景 Background



- 政府於二〇〇八年制定《能源效益(產品標籤)條例》(第598章)，分階段實施強制性能源效益標籤計劃。The Government has implemented the Mandatory Energy Efficiency Labelling Scheme (MEELS) in phases through the enactment of the Energy Efficiency (Labelling of Products) Ordinance (Cap. 598) since 2008.
- 規定在本港供應的訂明產品必須貼上能源標籤，讓消費者知悉產品的能源效益表現。Under the Ordinance, energy labels are required to be shown on all prescribed products for supply in Hong Kong to inform consumers of their energy efficiency performance.



政府持續檢討強制性能源效益標籤計劃的涵蓋範圍及評級標準
The Government regularly review the scope and grading standard of MEELS

第一次檢討評級標準
1st Review of Grading Standards



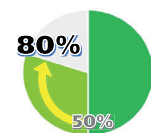
第二次檢討評級標準
2nd Review of Grading Standards



1. 背景 Background



強制性標籤計劃所涵蓋的住宅總能源消耗量
Total coverage of energy consumption in the residential sector by MEELS



估計每年可額外節省能源約
Potential additional annual energy saving



相當於每年減少約75 000公噸碳排放
Equivalent to the reduction of 75 350 tonnes of carbon emissions per year



發光二極管(LED)燈 Light Emitting Diode (LED) Lamps

2. 涵蓋範圍 Scope

- LED燈 指符合以下說明的燈 ——
 - 使用發光二極管技術(但並非使用有機發光二極管技術)來發出光線；及
 - 該支燈 ——
 - 能夠提供一般照明；
 - 使用市電作唯一電源；及
 - 額定瓦數值不超過60瓦特。
- LED lamp means a lamp—
 - that uses the light-emitting diode technology, but not the organic light-emitting diode technology, to emit light; and
 - that—
 - is capable of providing general lighting;
 - uses mains electricity as the only power source; and
 - has a rated lamp wattage not exceeding 60 watts.

2. 涵蓋範圍 Scope

220V

- ✓ 能夠提供一般照明
is capable of providing general lighting
- ✓ 使用市電作唯一電源
uses mains electricity as the only power source
- ✓ 最高額定瓦數值為60瓦
has a rated lamp wattage up to 60 watts

- ✓ 具有單燈頭
has a single lamp cap

including but not limited to:

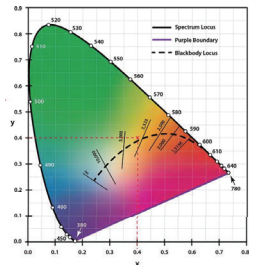


「LED燈」不包括有機發光二極管燈
"LED lamp" does not include organic LED lamps

2. 涵蓋範圍 Scope

- 色度坐標在以下範圍：
Chromaticity coordinates within the range:
 - $0.27 < x < 0.530$
 - $-2.3172x^2 + 2.3653x - 0.2199 < y < -2.3172x^2 + 2.3653x - 0.1595$

- 色度值範圍
Range of chromaticity values
 - IEC 62612 / ANSI C78.377



3. 測試要求 Test Requirements

- 測試標準 Test standard: IEC 62612:2013
- 要求進行的能源效益表現測試:
Energy efficiency performance tests required to be carried out:
 1. 光通量(初始值) luminous flux (initial)
 2. 功率消耗量(初始值) power consumption (initial);
 3. 備用功率消耗量(初始值) standby power consumption (initial)
 4. 顯色指數(初始值及在6000小時結束時的數值) colour rendering index (initial and at 6000 hours)
 5. 顏色一致性(初始值及在6000小時結束時的數值) colour consistency (initial and at 6000 hours)
 6. 位移因數(初始值) displacement factor (initial)
 7. 開關循環次數 number of switching cycles
 8. 測試6 000小時後的流明維持率 lumen maintenance at 6 000 hours
 9. 測試6 000小時後的存活率 lamp survival factor at 6 000 hours



3. 測試要求 Test Requirements

| 須進行的測試 Tests Required | 測試結果 Test Results | | |
|--|--|--|--|
| | 每個樣本的量度值 Measured value of each sample | 平均量度值 Average of the measured values | |
| 初始測試 (在穩定時間後) Initial measurements (after stabilisation period) | | | |
| 光通量 Luminous flux | 不得比額定光通量少10%以上 Not less than the rated luminous flux by more than 10% | 不得比額定光通量少7.5%以上 Not less than the rated luminous flux by more than 7.5% | |
| 功率消耗量 Power consumption | 不得比額定功率消耗量多10%以上 Not exceed the rated power by more than 10% | 不得比額定功率消耗量多7.5%以上 Not exceed the rated power by more than 7.5% | |
| 備用功率消耗量 (如適用) Standby power consumption (if applicable) | 不適用 Not applicable | ≤0.5瓦 ≤0.5W | |
| 顯色指數 Colour rendering index | ≥ 80 | 不適用 Not applicable | |
| 顏色一致性 Colour consistency | 維持於6階麥克亞當橢圓之內或更少 Within a 6-step MacAdam ellipse or less | 不適用 Not applicable | |
| 位移因數 Displacement factor | 不適用 Not applicable | 額定功率少於或等於2瓦 Rated power ≤ 2 W | 沒有規定 no requirement |
| | | 若額定功率超過2瓦和少於或等於5瓦 2W < Rated power ≤ 5W | 位移因數須超過或等於0.4 displacement factor ≥ 0.4 |
| | | 若額定功率超過5瓦和少於或等於25瓦 5W < Rated power ≤ 25W | 位移因數須超過或等於0.7 displacement factor ≥ 0.7 |
| | | 額定功率超過25瓦 Rated power > 25W | 位移因數須超過或等於0.9 displacement factor ≥ 0.9 |
| 開關循環 Switching cycle | 若額定電燈壽命超過或等於30 000小時，開關循環次數須超過或等於15 000次；其他則開關循環次數須超過或等於額定電燈壽命的一半 (以小時計) ≥ 15 000 if rated lamp life ≥ 30 000 hours, otherwise ≥ half the rated lamp life expressed in hours. | 不適用 Not applicable | |



3. 測試要求 Test Requirements

| 須進行的測試 Tests Required | 測試結果 Test Results | |
|--------------------------------|---|--------------------------------------|
| | 每個樣本的量度值 Measured value of each sample | 平均量度值 Average of the measured values |
| 在6 000小時結束時 | | |
| 顯色指數 Colour rendering index | ≥ 80 | 不適用 Not applicable |
| 顏色一致性 Colour consistency | 維持於6階麥克亞當橢圓之內或更少 Within a 6-step MacAdam ellipse or less | 不適用 Not applicable |
| 流明維持率 Lumen maintenance | 不適用 Not applicable | ≥ 80% |
| 電燈存活率 Lamp survival factor | 超過或等於測試樣本的90% ≥ 90% of the test samples | |

4. 能源效益評級 Energy Efficiency Grading

$$\text{發光效率 Luminous Efficacy} = \frac{\text{光通量 Luminous Flux}}{\text{瓦數 Wattage}}$$

能源效益級別是利用量度出的電燈發光效率 (E_m) 或額定電燈發光效率 (E_r)，兩者中以較低者來釐定。

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

| X 註(1) | | | | |
|----------------|----------------|----------------|----------------|----------------|
| 第1級 Grade 1 | 第2級 Grade 2 | 第3級 Grade 3 | 第4級 Grade 4 | 第5級 Grade 5 |
| X ≥ 110 | 110 > X ≥ 90 | 90 > X ≥ 63 | 63 > X ≥ 50 | 50 > X |

註 Note:

X = 量度出的電燈發光效率(E_m)或額定電燈發光效率(E_r)，兩者中以較低者來釐定。
measured lamp luminous efficacy (E_m) or the rated lamp luminous efficacy (E_r), whichever is smaller.



4. 能源效益評級

Energy Efficiency Grading

量度出的發光效率 Measured Luminous Efficacy (Em)

$$= \frac{199\text{lm}}{1.43\text{W}} = 139\text{lm/W}$$

額定發光效率 Rated Luminous Efficacy (Er)

$$= \frac{180\text{lm}}{2\text{W}} = 90\text{lm/W}$$

因為 $E_r < E_m$ ，所以 E_r (90 流明 / 瓦) 被用來釐定能源效益級別，該發光二極管燈被評定為第2級。

Since the $E_r < E_m$, the E_r (90 lm/W) is used to determine the energy efficiency grade, the LED lamp is rated as **Grade 2**.

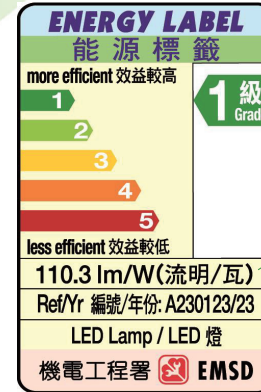
| 第1級 Grade 1 | 第2級 Grade 2 | 第3級 Grade 3 | 第4級 Grade 4 | 第5級 Grade 5 |
|----------------|-------------------|------------------|------------------|----------------|
| $X \geq 110$ | $110 > X \geq 90$ | $90 > X \geq 63$ | $63 > X \geq 50$ | $50 > X$ |

$X = E_m$ 或 E_r ，兩者中以較低者來釐定。
 $X = E_m$ or E_r , whichever is smaller.

| | | |
|---|------------|--|
| 額定功率輸入 Rated power input | 2W | |
| 額定光通量 Rated luminous flux | 180lm | |
| 額定電燈壽命 Rated lamp life | 25 000 hrs | |
| 在電燈穩定後的量度值： Measurements taken after stabilisation of the lamps: | | |
| 功率輸入 Power input | 1.43W | • 平均量度值不比額定功率消耗多7.5%以上 The average of the measured values does not exceed the rated power by > 7.5% • 每個樣本的量度值不比額定功率消耗多10%以上 The measured value of each sample do not exceed the rated power by > 10% |
| 備用功率消耗量 Standby power consumption | 0.3W | ≤ 0.5W |
| 光通量 Luminous flux | 199lm | • 平均量度值不比額定光通量少7.5%以上 The average of the measured values is not less than the rated luminous flux by more than 7.5% • 每個樣本的量度值不比額定光通量少10%以上 The measured value of each sample is not less than the rated luminous flux by more than 10% |
| 在6 000小時後的流明維持率 Lumen maintenance at 6 000 hours | 91% | ≥ 80% |
| 在6 000小時後的電燈存活率 Lamp survival factor at 6 000 hours | 100% | ≥ 90% |
| 顏色一致性 Colour consistency | 4 | ≤ 6 (在穩定時間後及在6 000小時後量度) |
| 顯色指數 Colour rendering index | 83 | ≥ 80 (在穩定時間後及在6 000小時後量度) |
| 位移因數 Displacement factor | 0.64 | 不適用 Not applicable |
| 開關循環 Number of switching cycles | 12 500 | 超過或等於額定電燈壽命的一半 (以小時計) ≥ half the rated lamp life expressed in hours. |

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5. 能源標籤的規格 Specification of Energy Label



能源效益級別
Energy Efficiency Grade

1級能源效益最高 (綠色) · 5級則最低 (紅色)
Grade 1 products are most efficient (Green) and Grade 5 products are least efficient (Red)

電燈發光效率
Lamp luminous efficacy of the model

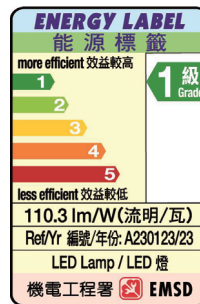
數值越高代表燈體能效越高
The higher the value, the more efficient the lamp.

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5. 能源標籤的規格 Specification of Energy Label

- 詳情請參閱第598章《能源效益(產品標籤)條例》附表2
For details, please refer to Schedule 2, Cap. 598 Energy Efficiency (Labelling of Products) Ordinance

- 能源標籤的顏色及設計
Colour and design of the energy label
- 能源標籤的尺寸
Dimensions of the energy label
- 能源標籤須載有的資料
Information to be contained on the label
- 印於能源標籤上的文字的字體規格
Specifications for the font size of the words printed on the energy label



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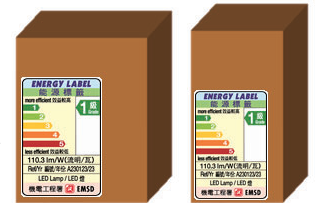
5. 能源標籤的規格 Specification of Energy Label

LED燈的能源標籤的大小，須按照以下準則挑選 —

The size of the LED lamp energy label is to be chosen in accordance with the following criteria —

《條例》附表2第10部第6條 Section 6, Part 10, Schedule 2 of the Ordinance

- 能源標籤須由最少闊2毫米的空白邊框圍繞，而其遮蓋產品包裝最大一面的範圍，不得超過該面的表面面積的50%。如能夠符合這規定，則須挑選指明尺寸 (i.e. 44mm x 65mm)。
The energy label is to be encircled by a blank border that is at least 2 mm wide, and it must not cover more than 50% of the surface area of the largest side of the product packaging. If it can be complied with the above requirements by choosing that size, the size specified is to be chosen (i.e. 44mm x 65mm).
- 如挑選最大標籤尺寸不能符合上述規定，則須從以下大小之中，挑選最大而符合(a)段規定者 — 最大標籤尺寸的90%、80%、70% 或 60%。
If the above requirements cannot be complied with by choosing the specified label size, then the largest of the following sizes that complies with the above requirements is to be chosen— 90%, 80%, 70% or 60% of the specified label size.



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氣體煮食爐 Gas Cookers

2. 涵蓋範圍 Scope

• 氣體煮食爐 ——

- a) 指符合以下說明的產品 ——
- (i) 屬《氣體安全(裝置及使用)規例》(第51章·附屬法例C)第2條所界定的**住宅式氣體用具**；
 - (ii) 產品一設計作藉燃燒煤氣或石油氣(兩者均為《氣體安全條例》(第51章)第2條所界定者)·**產生火焰供煮食用**；及
 - (iii) 該—
 - a) 屬嵌入式或座枱式；及
 - b) 每個燃燒器的額定熱負荷·**不超過7千瓦**；但
- b) 不包括手提卡式煮食爐。

• Gas cooker —

- a) means a product—
- (i) that is a **domestic gas appliance** as defined by regulation 2 of the Gas Safety (Installation and Use) Regulations (Cap. 51 sub. leg. C);
 - (ii) that is designed for **producing flames for cooking** by burning town gas, or liquefied petroleum gas, as defined by section 2 of the Gas Safety Ordinance (Cap. 51); and
 - (iii) that—
 - a) is of either built-in type or tabletop type; and
 - b) has a rated heat input **not exceeding 7 kilowatts** for each burner; but
- b) does not include a portable cassette cooker.

3. 測試要求 Test Requirements

- 測試標準 Test standard:
GB 30720-2014 《家用燃氣灶具能效限定值及能效等級》
Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Domestic Gas Cooking Appliances
- 要求進行的能源效益表現測試:
Energy efficiency performance tests required to be carried out:
 1. 每一個燃燒器的**熱負荷**測試 (數值須以高熱值顯示)；以及
Heat input test for each burner (in which values shall be expressed in **GCV**); and
 2. 每一個燃燒器的**熱效率**測試 (數值須以低熱值顯示)。
Thermal efficiency test for each burner (in which values shall be expressed in **NCV**).

3. 測試要求 Test Requirements

- 基準氣體的成分及測試條件 Compositions of Reference Gases and Test Conditions

| 基準氣體 Reference Gases | 成分Composition (所佔體積百分比) (% by Volume) (僅供參考) (For reference only) | 華白系數 Wobbe Index (兆焦耳 / 立方米) (MJ/m ³) (高熱值) (GCV) | 額定測試壓力 Nominal Pressure (千帕斯卡) (kPa) |
|--------------------------------------|---|--|---|
| 煤氣 Town gas | 氫 (H ₂): 50.5% · 甲烷 (CH ₄): 29.2% · 二氧化碳 (CO ₂): 17.4% · 一氧化碳 (CO): 1.2% · 空氣 (Air): 1.7% | 24.65 | 1.5 |
| 石油氣 Liquefied petroleum gas (LPG) | 丙烷 (C ₃ H ₈): 30% · 丁烷 (C ₄ H ₁₀): 70% | 84.17 | 2.9 |

測試實際採用的測試氣體·其華白系數與基準氣體的華白系數誤差值須在±2%範圍內。
The Wobbe Index of the test gas adopted for testing shall be within a tolerance of ±2% as compared to the Wobbe Index of the reference gas.

3. 測試要求 Test Requirements

- 有關型號須符合以下表現規定：
The concerned model shall conform with the following performance requirements:
- (a) 每個燃燒器量度所得的熱負荷，不得低於每個燃燒器額定熱負荷的90%，或高於每個燃燒器額定熱負荷的110%；以及
The measured heat input of each burner shall be neither less than 90% nor greater than 110% of the rated heat input of each burner; and
- (b) 每個計算出的熱效率須符合守則的規定。
The thermal efficiency calculated shall meet the requirements as stipulated in the Code.



4. 能源效益評級 Energy Efficiency Grading

- 熱效率測試須遵照GB30720進行，而用作測試的相關測試用鍋須符合GB30720附件C所訂明的要求及尺寸或署長批准的其他同等國際標準。
The thermal efficiency test shall be conducted in accordance with GB 30720 and the corresponding test pans used for the test shall satisfy the requirements and the size specification in Annex C of GB 30720, or other equivalent international standards approved by the Director.
- 根據GB30720並按燃燒器量度所得的熱負荷揀選兩個大小不同的測試用鍋進行測試，較大的為上限鍋，較小的為下限鍋。以該兩個測試用鍋分別進行熱效率測試，其計算方法如下：
Two test pans of different sizes, namely upper and lower limit pans, shall be selected by the measured heat input of the burner in accordance with GB 30720. The test shall be conducted with each test pan individually and the thermal efficiency is calculated as follows:

$$\eta = \frac{M \times c \times (t_2 - t_1)}{V \times Q} \times \frac{273 + t_g}{288} \times \frac{101.3}{p_{amb} + p_m - s} \times 100 \dots \dots (\text{eq. 1})$$

$$M = M_1 + 0.213M_2 \dots \dots (\text{eq. 2})$$

| | |
|-----------|---|
| η | = 量度所得的熱效率 (%) ; Measured thermal efficiency (%); |
| M | = 按方程式2(eq. 2)計算所得的數值：(a)實際加水質量及(b)鋁測試鍋質量 (千克) ; The value calculated in (eq. 2); the sum of (a) mass of water added and (b) mass of the aluminium test pan (kg); |
| c | = 水的比熱容，即 $c = 4.19 \times 10^{-3}$ (兆焦耳 / (千克·攝氏溫度)) ; Specific heat capacity of water, i.e. $c = 4.19 \times 10^{-3}$ (MJ/(kg · °C)); |
| t_1 | = 水的初始溫度 (攝氏) ; Initial water temperature (°C); |
| t_2 | = 水的最終溫度 (攝氏) ; Final water temperature (°C); |
| V | = 測試氣體消耗量 (立方米) ; Test gas consumed (m ³); |
| Q | = 在攝氏15度和101.3千帕斯卡狀態下的氣體輸入熱量 (低熱值) (兆焦耳 / 立方米) ; Thermal input (NCV) of the test gas at 15°C, 101.3kPa (MJ/m ³); |
| t_g | = 測試時氣體流量計內的氣體溫度 (攝氏) ; Temperature of gas in the gas flow meter at the time of measurement (°C); |
| p_{amb} | = 測試時的大氣壓力 (千帕斯卡) ; Atmospheric pressure at the time of measurement (kPa); |
| p_m | = 測試時氣體流量計內的靜壓 (千帕斯卡) ; Static pressure on the gas flow meter at the time of measurement (kPa); |
| s | = 溫度為 t_g 時的飽和水蒸氣壓力 (千帕斯卡) ; 如使用乾式氣體流量計測量， s 值則應乘以氣體的相對濕度，以作修正； Saturated water vapour pressure at t_g (kPa); if a dry gas flow meter is used, s should be corrected by multiplying the relative humidity of the test gas; |
| M_1 | = 加入鋁鍋的水質量 (千克) ; 以及 Mass of the water added into the pan (kg); and |
| M_2 | = 鋁鍋質量 (包括鍋蓋及攪拌器) (千克) ; Mass of the aluminium test pan (including the cover and the stirrer) (kg); |



4. 能源效益評級 Energy Efficiency Grading

- 燃燒器的能源效益評級，須按方程式3 (eq.3) 計算得的熱效率來釐定。
The energy efficiency grading of a burner is determined by the thermal efficiency of the burner calculated in eq. 3.
- 所提交的測試報告必須載有根據方程式1至3 (eq.1 to 3) 進行的相關測試所採用的數據及所得結果，以說明量度所得的熱效率的計算方法。
The test report to be submitted shall contain relevant test data adopted and results obtained in accordance with eq. 1 to eq. 3 for illustrating the calculation of the measured thermal efficiency.
- 以上限鍋及下限鍋量度所得的熱效率，計算燃燒器的熱效率如下：
By using the upper limit pan and the lower limit pan, the thermal efficiency of a burner is calculated as follows:

$$\eta = \eta_{lower} + \frac{q_{lower} - 5.47}{q_{lower} - q_{upper}} \times (\eta_{upper} - \eta_{lower}) \dots \dots (\text{eq. 3})$$

| | |
|--|---|
| η | = 熱效率 (%) ; Thermal efficiency (%); |
| η_{lower} | = 以下限鍋量度所得的熱效率 (%) ; Measured thermal efficiency by using the lower limit pan (%); |
| η_{upper} | = 以上限鍋量度所得的熱效率 (%) ; Measured thermal efficiency by using the upper limit pan (%); |
| q_{lower} | = 下限鍋底的熱強度* (瓦 / 平方厘米) ; 及 Thermal intensity* at the bottom of the lower limit pan (W/cm ²); |
| q_{upper} | = 上限鍋底的熱強度* (瓦 / 平方厘米) ; Thermal intensity* at the bottom of the upper limit pan (W/cm ²). |
| *熱強度 = 量度所得的熱負荷 (瓦) / 鍋底面積 (平方厘米) | |
| *Thermal intensity = measured power (W)/ area of the bottom of the test pan (cm ²) | |



4. 能源效益評級 Energy Efficiency Grading

- 能源效益級別的釐定
Derivation of Energy Efficiency Grades

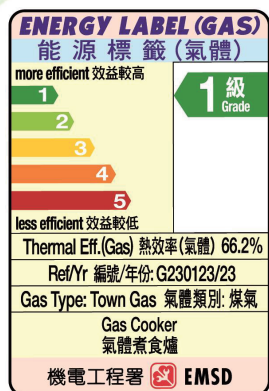
| 氣體煮食爐類型 Gas Cooker Types | 熱效率 Thermal Efficiency (%) | | | | |
|-----------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | 第1級 Grade 1 | 第2級 Grade 2 | 第3級 Grade 3 | 第4級 Grade 4 | 第5級 Grade 5 |
| 座枱式 Table-top | ≥ 66 | ≥ 62 | ≥ 58 | ≥ 54 | < 54 |
| 嵌入式 Built-in | ≥ 63 | ≥ 59 | ≥ 55 | ≥ 51 | < 51 |

註 Note:

若氣體煮食爐有兩個或以上的燃燒器，該煮食爐將根據最低熱效率值的燃燒器來釐定整體能源效益級別。
For a gas cooker with two or more burners, the lowest energy efficiency grade among all burners is used to determine the overall energy efficiency grading.



5. 能源標籤的規格 Specification of Energy Label



能源效益級別
Energy Efficiency Grade

1級能源效益最高 (綠色) · 5級則最低 (紅色)
Grade 1 products are most efficient (Green) and Grade 5 products are least efficient (Red)

熱效率
Thermal efficiency

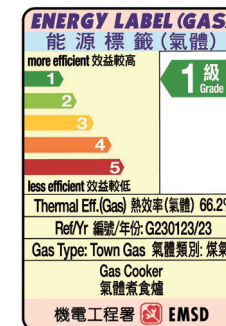
數值越高代表氣體煮食爐能效越高
The higher the value, the more efficient the gas cooker.



5. 能源標籤的規格 Specification of Energy Label

詳情請參閱第598章《能源效益(產品標籤)條例》附表2
For details, please refer to Schedule 2, Cap. 598 Energy Efficiency (Labelling of Products) Ordinance

- ① 能源標籤的顏色及設計
Colour and design of the energy label
- ② 能源標籤的尺寸
Dimensions of the energy label
- ③ 能源標籤須載有的資料
Information to be contained on the label
- ④ 印於能源標籤上的文字的字體規格
Specifications for the font size of the words printed on the energy label



即熱式氣體熱水爐 Gas Instantaneous Water Heaters



2. 涵蓋範圍 Scope

- 即熱式氣體熱水爐 指符合以下說明的產品——
 - a) 屬《氣體安全(裝置及使用)規例》(第51章·附屬法例C)第2條所界定的**住宅式氣體用具**；
 - b) 該產品——
 - (i) 設計作藉燃燒煤氣或石油氣(兩者均為《氣體安全條例》(第51章)第2條所界定者)·**將流經該產品的熱交換器的水加熱**；及
 - (ii) 設有裝置·因應水流而控制氣體流量；及
 - c) 該產品的額定熱負荷·**不超過70千瓦**。
- Gas instantaneous water heater means a product—
 - a) that is a **domestic gas appliance** as defined by regulation 2 of the Gas Safety (Installation and Use) Regulations (Cap. 51 sub. leg. C);
 - b) that—
 - (i) is designed for **heating water that flows through the product's heat exchanger** by burning town gas, or liquefied petroleum gas, as defined by section 2 of the Gas Safety Ordinance (Cap. 51); and
 - (ii) has a mechanism to control gas passage relative to water flow; and
 - (iii) that has a rated heat input **not exceeding 70 kilowatts**.



3. 測試要求 Test Requirements

- 測試標準 Test standard:
 - GB 20665-2015 《家用燃氣快速熱水器和燃氣採暖熱水爐能效限定值及能效等級》
Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Domestic Gas Instantaneous Water Heaters and Gas Fired Heating and Hot Water Combi-boilers
- 要求進行的能源效益表現測試:
Energy efficiency performance tests required to be carried out:
 - 熱負荷測試 (數值須以高熱值顯示) ; 以及
Heat input test (in which values shall be expressed in GCV); and
 - 熱效率測試 (數值須以低熱值顯示) 。
Thermal efficiency test (in which values shall be expressed in NCV).



3. 測試要求 Test Requirements

- 基準氣體的成分及測試條件 Compositions of Reference Gases and Test Conditions

| 基準氣體 Reference Gases | 成分Composition (所佔體積百分比) (% by Volume) (僅供參考) (For reference only) | 華白系數 Wobbe Index (兆焦耳 / 立方米) (MJ/m ³) (高熱值) (GCV) | 額定測試壓力 Nominal Pressure (千帕斯卡) (kPa) |
|--------------------------------------|---|--|---|
| 煤氣 Town gas | 氫 (H ₂): 50.5% · 甲烷 (CH ₄): 29.2% · 二氧化碳 (CO ₂): 17.4% · 一氧化碳 (CO): 1.2% · 空氣 (Air): 1.7% | 24.65 | 1.5 |
| 石油氣 Liquefied petroleum gas (LPG) | 丙烷 (C ₃ H ₈): 30% · 丁烷 (C ₄ H ₁₀): 70% | 84.17 | 2.9 |

測試實際採用的測試氣體，其華白系數與基準氣體的華白系數誤差值須在±2%範圍內。
The Wobbe Index of the test gas adopted for testing shall be within a tolerance of ±2% as compared to the Wobbe Index of the reference gas.



3. 測試要求 Test Requirements

- 有關型號須符合以下表現規定:
The concerned model shall conform with the following performance requirements:
 - 量度所得的熱負荷，不得低於熱水爐額定熱負荷的90%，或高於其額定熱負荷的110%；以及
The measured heat input shall be neither less than 90% nor greater than 110% of the rated heat input of the heater.
 - 計算出的熱效率須符合守則的規定。
The thermal efficiency calculated shall meet the requirements as stipulated in the Code.



4. 能源效益評級 Energy Efficiency Grading

- 熱效率測試須遵照GB 20665或署長批准的其他同等國際標準進行。須在滿載功率和半載功率的狀態下進行測試。計算方式如下:
The thermal efficiency test shall be conducted in accordance with GB 20665 or other equivalent international standards approved by the Director.
The test shall be conducted at 100% load and 50% load condition and be calculated as follows:

$$\eta = \frac{M \times c \times (t_{w2} - t_{w1})}{V \times Q} \times \frac{273 + t_g}{273} \times \frac{101.3}{P_{amb} + P_g - S} \times 100$$

| | |
|-----------|--|
| η | = 熱效率 (%) ; Thermal efficiency (%); |
| c | = 水的比熱容，即 $c = 4.19 \times 10^{-3}$ (兆焦耳 / (千克·攝氏溫度)) Specific heat capacity of water, i.e. $c = 4.19 \times 10^{-3}$ (MJ/(kg·°C)); |
| M | = 熱水流量 (千克 / 分鐘) ; Flow rate of hot water (kg/min); |
| t_{w2} | = 出水溫度 (攝氏) ; Temperature of water outlet (°C); |
| t_{w1} | = 入水溫度 (攝氏) ; Temperature of water inlet (°C); |
| Q | = 測試氣體的燃氣輸入熱量 (低熱值) (兆焦耳 / 立方米) ; Thermal input (NCV) of the test gas (MJ/m ³); |
| V | = 測試氣體的流量 (立方米 / 分鐘) ; Flow rate of the test gas (m ³ /min); |
| t_g | = 量度時氣體流量計內的氣體溫度 (攝氏) ; Temperature of gas in the gas flow meter at the time of measurement (°C); |
| P_{amb} | = 測試時的大氣壓力 (千帕斯卡) ; Atmospheric pressure during testing (kPa); |
| P_g | = 測試時氣體流量計量得的氣體壓力 (千帕斯卡) ; 以及 Gas pressure measured by the gas flow meter during testing (kPa); and |
| S | = 溫度為 t_g 時的飽和水蒸氣壓力 (千帕斯卡) ; 如使用乾式氣體流量計測量， s 值應乘以測試氣體的相對濕度，以作調整 ; Saturated water vapour pressure at t_g (kPa); if a dry gas flow meter is used, s should be adjusted by multiplying the relative humidity of the test gas; |



4. 能源效益評級 Energy Efficiency Grading

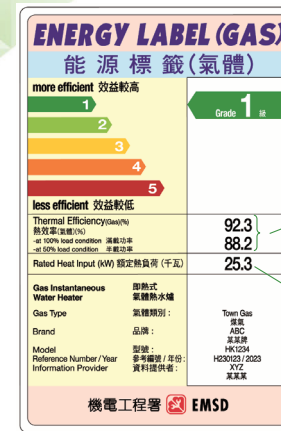
能源效益級別的釐定
Derivation of Energy Efficiency Grades

| 熱效率 Thermal Efficiency (%) | | 第1級 Grade 1 | 第2級 Grade 2 | 第3級 Grade 3 | 第4級 Grade 4 | 第5級 Grade 5 |
|--|---|----------------|----------------|----------------|----------------|----------------|
| 在滿載功率和半載功率的狀態下量度： Measured at 100% load and 50% load: | | | | | | |
| η_1 | 熱效率較高值 (在滿載功率或半載功率的狀態下均可) Thermal efficiency of higher value (either at 100% load or 50% load) | ≥ 92 | ≥ 89 | ≥ 86 | ≥ 83 | < 83 |
| η_2 | 熱效率較低值 (在滿載功率或半載功率的狀態下均可) Thermal efficiency of lower value (either at 100% load or 50% load) | ≥ 88 | ≥ 85 | ≥ 82 | ≥ 79 | < 79 |

註 Notes:

- 當 η_1 和 η_2 達到同一級別，即熱式氣體熱水爐會相應地獲得同一級別的能源效益評級。
When both η_1 and η_2 attain the same grade, the same energy efficiency grading of a gas instantaneous water heater will be assigned correspondingly.
- 當 η_1 和 η_2 達到不同級別，即熱式氣體熱水爐會相應地獲得較低的能源效益評級。
When η_1 and η_2 attain different grades, the lower energy efficiency grading of a gas instantaneous water heater will be assigned correspondingly.

5. 能源標籤的規格 Specification of Energy Label



能源效益級別
Energy Efficiency Grade

1級能源效益最高 (綠色) · 5級則最低 (紅色)
Grade 1 products are most efficient (Green) and Grade 5 products are least efficient (Red)

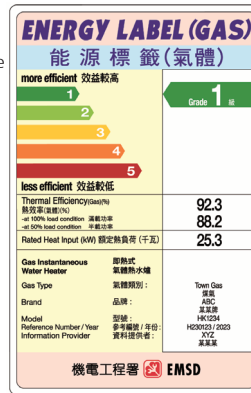
在滿載功率和半載功率下的熱效率
Thermal efficiency at 100% and 50% load conditions

數值越高代表即熱式氣體熱水爐能效越高
The higher the value, the more efficient the Gas Instantaneous Water Heaters.

額定熱負荷
Rated heat input

5. 能源標籤的規格 Specification of Energy Label

- 詳情請參閱第598章《能源效益(產品標籤)條例》附表2
For details, please refer to Schedule 2, Cap. 598 Energy Efficiency (Labelling of Products) Ordinance



- 能源標籤的顏色及設計
Colour and design of the energy label
- 能源標籤的尺寸
Dimensions of the energy label
- 能源標籤須載有的資料
Information to be contained on the label
- 印於能源標籤上的文字的字體規格
Specifications for the font size of the words printed on the energy label

6. 過渡期安排 Transitional Arrangement

- 建議供應商在全面實施前完成處理現有存貨，以避免令人產生混亂。
It is advised that suppliers should clear existing stock before full implementation in order to avoid causing confusion to consumers.

如有證明提出令署長信納，某新訂明產品在生效日期前：-

- 已在香港製造或已進口香港；或
 - 已就供應給新落成處所訂立採購合約。
- 進口商可繼續供應這些沒有參考編號及能源標籤的訂明產品。

If it is proved to the satisfaction of the Director, a new prescribed product that before the commencement date:-

- has been manufactured in or imported into Hong Kong; or
 - which the contract has been entered into for disposition of any newly completed premises.
- Importers can continue to supply these prescribed products without reference number and energy label.

生效日期
Commencement Date
2023年9月1日
1 Sept 2023

全面實施
Full Implementation
2024年12月1日
1 Dec 2024

生效日期前 Before Commencement Date

15個月過渡期 15-month Transitional Period

6. 過渡期安排 Transitional Arrangement

進口商或本地製造商的責任 Obligations of Importers and Local Manufacturers

- 為配合全面實施，有關產品型號獲參考編號後，製造商或進口商可於過渡期內在貼上能源標籤，並在本港供應產品。
To facilitate the full implementation, manufacturers or importers can supply a product with an energy label in Hong Kong after it has been assigned a reference number during the transitional period.

呈交新產品資料 New Product Information Submission

- 填妥的表格1 - 呈交指明資料及指明文件
Duly completed Form 1 – Submission of Specified Information and Specified Documents
- 由認可實驗室所發出的產品測試報告
Product test report issued by recognised laboratory
- 能源效益級別計算方法和其他輔助技術資料
Energy efficiency grading calculations and other supporting technical information

呈交已根據自願性能源效益標籤計劃 註冊的產品型號的資料 Information Submission for Product Model Already Registered in Voluntary Energy Efficiency Labelling Scheme

- 填妥的表格2 - 呈交已在自願性能源效益標籤計劃註冊產品的資料
Duly completed Form 2 – Information Submission for Product Model Already Registered in Voluntary Energy Efficiency Labelling Scheme
- 能源效益級別計算方法
Energy efficiency grading calculations
- 其他輔助技術資料
Other supporting technical information

生效日期
Commencement Date
2023年9月1日
1 Sept 2023

全面實施
Full Implementation
2024年12月1日
1 Dec 2024

生效日期前 Before Commencement Date

15個月過渡期 15-month Transitional Period



6. 過渡期安排 Transitional Arrangement

供應商的責任 Obligations of Suppliers

在過渡期過後，本港所有供應商(包括製造商、進口商、批發商、零售商等)供應的訂明產品必須屬已獲機電工程署編配參考編號的型號，並附有指明規格的能源標籤。

After the transitional period, all local suppliers (including manufacturers, importers, wholesalers, retailers, etc.)

shall supply a prescribed product which is of model having a reference number assigned by EMSD and bears a specified energy label

生效日期
Commencement Date
2023年9月1日
1 Sept 2023

全面實施
Full Implementation
2024年12月1日
1 Dec 2024

生效日期前 Before Commencement Date

15個月過渡期 15-month Transitional Period



6. 過渡期安排結束 End of Transitional Arrangement

任何人如違反條例的規定，供應沒有能源標籤或屬非表列型號的訂明產品，可處罰款10萬元。

Any person who contravenes the Ordinance by supplying a prescribed product without energy label or a prescribed product of non-listed model is liable to a fine of \$100,000.

生效日期
Commencement Date
2023年9月1日
1 Sept 2023

全面實施
Full Implementation
2024年12月1日
1 Dec 2024

執行
Enforcement

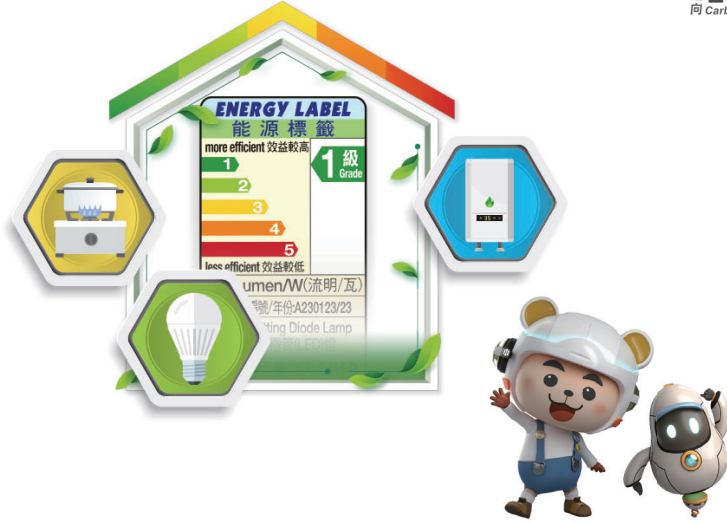
生效日期前 Before Commencement Date

15個月過渡期 15-month Transitional Period



進口商或本地製造商的責任 Obligations of Importers and Local Manufacturers

- 在供應訂明產品前，呈交產品資料(包括測試報告)
- 按《條例》及獲編配參考編號等資料貼上能源標籤
- 確保訂明產品的能效及功能特性符合向機電工程署所呈交的該等資料
- 如向機電工程署呈交的資料(如：功能特性、測試報告等)有所改變，須在改變後21日內以書面通知機電工程署
- 如該型號被改動的程度使其能源效益及功能特性與所呈交者不同，須為該經改動型號取得新的參考編號。
- 每隔不超過5年呈交產品最新資料



謝謝！
Thank You!