

# Proposal on the Coverage of New Potential Products under the Fourth Phase of the Mandatory Energy Efficiency Labelling Scheme (MEELS)

## Consultation Document

### ENERGY LABEL

### 能源標籤

more efficient 效益較高

1

2

3

4

5

less efficient 效益較低

1 級  
Grade

110 Lumen/W(流明/瓦)

編號/年份:A230123/23

Light Emitting Diode Lamp

LED管(LED)燈



Gas Cookers



Light Emitting Diode (LED) Lamps



Gas Instantaneous Water Heaters

March 2021

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## Abbreviations

The abbreviations used in this paper are listed below:

Abbreviation	Name in Full
CFLs	Compact Fluorescent Lamps
CNAS	China National Accreditation Service for Conformity Assessment
CoP	Code of Practice on Energy Labelling of Products
EU	European Union
LED	Light-Emitting Diode
MEELS	Mandatory Energy Efficiency Labelling Scheme
VEELS	Voluntary Energy Efficiency Labelling Scheme





# Mandatory Energy Efficiency Labelling Scheme

## Purpose

1. We would like to invite your views on the proposal for inclusion of three additional types of products, namely Light-Emitting Diode (LED) lamps, gas cookers and gas instantaneous water heaters, into the fourth phase of the Mandatory Energy Efficiency Labelling Scheme (MEELS).

## Mandatory Energy Efficiency Labelling Scheme

2. The Mandatory Energy Efficiency Labelling Scheme (MEELS) was introduced through the Energy Efficiency (Labelling of Products) Ordinance (Cap.598) (Ordinance), which was enacted on 9 May 2008. 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.
3. The MEELS has been implementing in phases as follows:
  - (i) The initial phase of the MEELS, covering three types of products, namely room air conditioners, refrigerating appliances and compact fluorescent lamps (CFLs), has been fully implemented since 9 November 2009.
  - (ii) The second phase of the MEELS, extending the coverage to two more electrical products, namely washing machines and dehumidifiers, has been fully implemented since 19 September 2011.
  - (iii) The upgrading of energy efficiency standards for three types of products, namely room air conditioners, refrigerating appliances and washing machines has been fully implemented since 25 November 2015.
  - (iv) The third phase of the MEELS further extends the coverage to three additional types of electrical products, namely televisions, storage type electric water heaters and induction cookers, and expands the scope of room air conditioners and washing machines. The third phase has been fully implemented since 1 December 2019.
  - (v) To further encourage suppliers to provide more energy efficient products to consumers, new energy efficiency grading requirements of single package type room air conditioners, dehumidifiers and CFLs have been set, which took effect on 31 December 2020 and will be fully implemented on 31 December 2021, after which the three type of prescribed products to be supplied in the market must bear energy labels with the new energy efficiency grading standards.

The three phases of the MEELS regulate eight types of household electrical appliances, which account for about 70% of the annual residential electricity consumption in Hong Kong in accordance with Hong Kong Energy End-use Data 2020.

4. The Code of Practice on Energy Labelling of Products (CoP) is approved and issued under section 42 of the Ordinance. The CoP provides practical guidance for requirements under the Ordinance. The latest edition of the CoP is available at the website of the Electrical and Mechanical Services Department (EMSD) with the following link:

<https://www.emsd.gov.hk/energylabel/>

5. In order to help the general public choose energy efficient appliances and capitalise further energy saving, it is considered advisable to include more products into the MEELS.
6. Chapter 3 of this document outlines the initial proposal on extending the coverage to include three additional types of products, namely LED lamps, gas cookers and gas instantaneous water heaters into the MEELS.

Annex A outlines the detailed test requirements and determination of energy efficiency grading for the proposed products and Annex B contains the proposed energy label samples.

7. Chapter 4 of this document outlines the proposed transitional arrangement of the fourth phase of the MEELS.
8. Chapter 5 of this document outlines the roadmap and planning arrangement of the fourth phase of the MEELS.
9. Chapter 6 and Annex C of this document invite views from the public on the proposal of the fourth phase of the MEELS on or before **31 May 2021**.

## 2 Background information

10. The following types of household appliances account for about 31% of the total energy consumption in the residential sector in 2018 in accordance with Hong Kong Energy End-use Data 2020:
- (i) LED lamps;
  - (ii) Gas cookers; and
  - (iii) Gas instantaneous water heaters.

By incorporating the proposed three products into the MEELS, together with the existing eight prescribed products in the first three phases of the MEELS, the total coverage of energy consumption in the residential sector by the MEELS will increase from 49% to about 80% in accordance with Hong Kong Energy End-use Data 2020. Besides, the three products have been covered in the current Voluntary Energy Efficiency Labelling Scheme (VEELS).

The reasons for the three products proposed to be included in the MEELS are as follows:

### LED lamps

- With the increasing adoption of LED lamps among domestic households in Hong Kong in recent years, it is estimated that the inclusion of LED lamps into the MEELS will not only encourage consumers to replace CFLs with LED lamps but also capture high potential energy savings.
- LED lamps are covered in the mandatory labelling schemes in some other jurisdictions (such as the Mainland of China, the European Union (EU) and Singapore). International test standards and local accredited testing laboratories are available for testing the energy performance of LED lamps.

### Gas cookers and gas instantaneous water heaters

- Given that all the prescribed products under the first three phases of the MEELS are electrical appliances, it is proposed to expand the coverage of the MEELS to include gas cookers and gas instantaneous water heaters in order to further capture potential energy savings from different types of fuel.
- Both gas appliances are covered in the mandatory scheme in the Mainland of China and Taiwan, China.

## Overseas Practice

11. The proposed products have already been covered in the mandatory labelling schemes of other economies up to 2020 as shown below.

Proposed Products	Mandatory Labelling Schemes in Other Overseas Economies						
	Australia	Canada	The Mainland of China	EU	Singapore	South Korea	Taiwan, China
LED lamps	–	–	Yes	Yes	Yes	Yes	–
Gas cookers	–	–	Yes	–	–	–	Yes
Gas instantaneous water heaters	–	–	Yes	Yes	–	Yes	Yes

# 3

## Proposal for Inclusion of the Following Products into the Fourth Phase of the Mandatory Energy Efficiency Labelling Scheme

### 3.1 – LED Lamps

#### Considerations for Inclusion into the MEELS

12. The following information has been taken into account in considering inclusion of LED lamps into the MEELS:
- (i) Overseas Practices:
    - LED lamps are widely covered in the mandatory labelling schemes of overseas economies (including the Mainland of China, the EU and Singapore).
  - (ii) Test Standards:
    - International test standard (IEC 62612:2013) is available for energy efficiency performance measurement of LED lamps.
  - (iii) Availability of Testing Laboratories:
    - Accredited testing laboratories are available in Hong Kong, the Mainland of China, the EU, South Korea, Malaysia, etc. for testing the energy efficiency performance of LED lamps.
  - (iv) Energy Saving Potential:
    - It is roughly estimated that the potential energy saving is relatively high.
  - (v) The VEELS Records:
    - Over 144 models (up to December 2020) have been registered under the VEELS.

#### Proposed Test Standard

13. LED lamps are currently covered under the VEELS. The test standards for measuring photometric and electrical performances (e.g. efficacy) are based on the standard IEC 62612:2013, Self-ballasted LED lamps for general lighting services with supply voltages > 50V – Performance Requirements or equivalent standards and thus is proposed to be adopted in the MEELS.
14. The energy efficiency grade for LED lamps is proposed to be determined by the measured lamp luminous efficacy or the rated luminous efficacy, whichever is smaller. For details of test requirements and determination of energy efficiency grading, please refer to Annex A.



## Proposed Scope

15. LED lamp means a product –
- (a) that is a type of directional or non-directional lighting emitting diode lamp which has a single lamp cap;
  - (b) that is of integrated type; and
  - (c) that is intended for general lighting purposes, and –
    - (i) uses mains electricity as the only power source;
    - (ii) has a rated lamp wattage up to 60 watts; and
    - (iii) has either non-dimming or dimming design (including white-tunable lamp).
16. LED lamp does not include –
- (a) lighting emitting diode tubes;
  - (b) lighting emitting diode lamps that intentionally produce tinted or coloured light; or
  - (c) organic lighting emitting diode lamps.

## 17. Grading Scheme

	<b>X</b> <sup>Note (1)</sup>				
<b>Energy Efficiency Grade</b>	<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>	<b>Grade 5</b>
<b>Lamp Luminous Efficacy (Lumen/W)</b>	≥ 110	≥ 90	≥ 63	≥ 50	< 50

Note:

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

18. The proposed energy label is “Grading Type” and similar to the current MEELS. There will be five energy efficiency grades, with Grade 1 being the most energy efficient and Grade 5 the least efficient. Please refer to Annex B for the proposed energy label sample.

## Acceptance of Interim Report

19. Since it may take at least 8 months to complete the full tests for LED lamps (6 000 hours), it is proposed that the person submitting the specified information of a product model may submit test reports in stages, namely interim test report in 3 000 hours and full test report while the use of ANSI/IES LM-80-15 (IES Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules) test report is not considered.
20. After submitting the interim test report, it is proposed that the specified person should submit progress test reports to the Director of Electrical and Mechanical Services at intervals of not exceeding 5 months after the date of the submission of the interim test report until the specified person submits a full test report.
21. The progress test report is to present the latest results of the test in progress with respect to the lamp life whereas the full test report is to present the final results of all the tests as required in the CoP. The results of the lamp life test presented in the interim test report, progress test reports and full test report shall refer to the same test on the same set of samples.

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

### Compliance

23. Compliance monitoring testing will be carried out regularly to check whether the LED lamps conform to the requirements. The conformance requirements are proposed as follows:
- The average of the lamp luminous efficacy calculated shall be equal to or better than the requirements of lamp luminous efficiency for the respective grade submitted in the application.
  - The average of the tested lumen maintenance at 6 000-hour shall not be less than 80%.
  - The average of the tested lamp survival factor at 6 000-hour shall not be less than 90%.

## **3.2 – Gas Cookers**

### Considerations for Inclusion into the MEELS

24. The following information has been taken into account in considering inclusion of gas cookers into the MEELS:

(i) Overseas Practices:

- Gas cookers are covered in the mandatory labelling schemes of some economies (including the Mainland of China and Taiwan, China). The scheme in the Mainland of China only applies to gas cookers with each burner of rated power  $\leq 5.92\text{kW}^1$ .
- The mandatory scheme in Taiwan, China only applies to gas cookers using liquefied petroleum gas (LPG) and natural gas fuel type.

(ii) Test Standards:

- In the schemes of the Mainland of China and Taiwan, China, gas cookers are tested in accordance with their test standards GB 30720:2014 and CNS 13604 respectively.
- Other test standards do not include requirements for the grading purpose.
- The MEELS is proposed to adopt GB 30720:2014 with a consideration of its applicability of the grading mechanism to Hong Kong models and a large proportion (i.e. over 40%<sup>2</sup>) of imports from the Mainland of China.

(iii) Availability of Testing Laboratories:

- For test standard GB 30720:2014, accredited testing laboratories by China National Accreditation Service for Conformity Assessment (CNAS) are available in the Mainland of China for testing the energy efficiency performance of gas cookers.

<sup>1</sup> Rated power is usually expressed in Gross Calorific Value (GCV) for gas appliance industry in Hong Kong, China whereas Net Calorific Value (NCV) is used in GuoBiao (GB) standard in the Mainland of China. Therefore, all power ratings are converted to equivalent GCV, unless otherwise indicated, for ease of reference.

<sup>2</sup> A survey study by an independent consultant revealed that gas cookers imported from the Mainland of China comprises the largest proportion of the market (40.6%) in Hong Kong in 2017-2019, followed by imports from Japan (26.7%) and from Taiwan, China (18.7%).

(iv) Energy Saving Potential:

- It is roughly estimated that the potential energy saving is relatively medium among the three proposed products (i.e. LED lamps, gas cookers and gas instantaneous water heaters).

(v) The VEELS Records:

- Over 301 models (up to December 2020) have been registered under the VEELS.

Proposed Test Standard

25. Currently, gas cookers covered under the VEELS are tested in compliance with GB 16410:2007 “Domestic gas cooking appliances”. In view of test standard development, GB 30720:2014 “Minimum allowable values of energy efficiency and energy efficiency grades for domestic gas cooking appliances” sets out detailed energy efficiency requirements for domestic cooking appliances, which is relatively more specific than GB 16410:2007 as an energy efficiency test standard for gas cookers.
26. GB 30720:2014 only applies to gas cookers with each burner of rated power  $\leq 5.92\text{kW}$ . A study has been conducted by China Quality Supervising and Test Center for Gas Appliances (CGAC)<sup>3</sup>, to confirm the same testing method and grading requirement can be applied to burners of rated power up to 7kW for gas cookers in Hong Kong. Therefore, it is proposed to adopt the latest GB 30720:2014 in the MEELS for gas cookers covering those with each burner of rated power  $\leq 7\text{kW}$ .
27. The proposed energy efficiency grade for each burner is determined by the thermal efficiency of the burner measured. For details of test requirements and determination of energy efficiency grading, please refer to Annex A.

Proposed Scope

28. Gas cooker means a product –
- a) that is a domestic gas appliance which is designed, or intended to be used primarily in domestic premises; and
  - (b) that –
    - (i) burns gas types defined in the Gas Safety Ordinance (Cap.51);
    - (ii) has a rated power not exceeding 7kW for each burner; and
    - (iii) is either table-top type or built-in type.
29. Grading Scheme

Energy Efficiency Grade Thermal Efficiency (%)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Table-top	$\geq 66$	$\geq 62$	$\geq 58$	$\geq 54$	$<54$
Built-in	$\geq 63$	$\geq 59$	$\geq 55$	$\geq 51$	$<51$

For a gas cooker with two or more burners, the lowest energy efficiency grade among burners is used to determine the overall energy efficiency grade.

<sup>3</sup> CGAC is authorised by the General Administration of Quality Supervision, Inspection and Quarantine of the People’s Republic of China to carry out product testing, compliance testing, review of test standards, etc. for gas appliances. It is also responsible for carrying out safety and energy performance tests certifying domestic gas appliances imported from the Mainland of China to Hong Kong.

30. The proposed energy label is “Grading Type” and similar to the current MEELS. There will be five energy efficiency grades, with Grade 1 being the most energy efficient and Grade 5 the least efficient. Please refer to Annex B for the proposed energy label sample.

### Compliance

31. Compliance monitoring testing will be carried out regularly to check whether the gas cookers conform to the requirements. The conformance requirement is proposed as follows:
- The tested thermal efficiency shall not be lower than 94-98% of the measured value submitted in the application.

## **3.3 – Gas Instantaneous Water Heaters**

### Considerations for Inclusion into the MEELS

32. The following information has been taken into account in considering the inclusion of gas water heaters into the MEELS:

(i) Overseas Practices:

- Gas instantaneous water heaters are covered in the mandatory labelling schemes of some overseas economies (including the Mainland of China, the EU, South Korea and Taiwan, China).
- The scheme in the Mainland of China only applies to gas instantaneous water heaters (rated power  $\leq 70\text{kW}$ ).
- The scheme in the EU applies to not only gas instantaneous water heaters, but also electric water heaters, heat pump water heaters, storage water heaters, hot water storage tanks and solar water heaters. Same grading requirement applies to all the above-mentioned products in the EU.
- The scheme in Taiwan, China only applies to gas instantaneous water heaters using liquefied petroleum gas (LPG) and natural gas.

(ii) Test Standards:

- In the schemes of the above-mentioned economies, gas instantaneous water heaters are tested in accordance with their own test standards.
- The grading mechanism of test standard in the EU is not technically specific to gas appliances.
- The MEELS is proposed to adopt GB 20665:2015 with a consideration of its applicability of the testing and grading mechanism to models in the market and a large proportion (i.e. over 58%<sup>4</sup>) of the Hong Kong models being imported from the Mainland of China.

(iii) Availability of Testing Laboratories:

- For test standard GB 20665:2015, accredited testing laboratories by CNAS are available in the Mainland of China for testing the energy efficiency performance of gas instantaneous water heaters.

<sup>4</sup> A survey study by an independent consultant revealed that gas instantaneous water heaters imported from the Mainland of China comprises the largest proportion of the market (58.2%) in Hong Kong in 2017-2019, followed by imports from Japan (28.8%) and from Taiwan, China (13%).

(iv) Energy Saving Potential:

- It is roughly estimated that the potential energy saving is relatively medium among the 3 potential products (i.e. LED lamps, gas cookers and gas instantaneous water heaters).

(v) The VEELS Records:

- Over 334 models (up to December 2020) have been registered under the VEELS.

Proposed Test Standard

33. Currently in Hong Kong, gas instantaneous water heaters are covered under the VEELS. The measurement of energy efficiency performance of gas water heaters under the VEELS is based on one of the following standards: (i) EN26 *“Gas-fired Instantaneous Water Heaters for the Production of Domestic Hot Water”*, (ii) GB 6932 *“Domestic gas instantaneous water heaters”* or (iii) JIA F 031 *“Inspection Standard for Gas Water Heaters for Hong Kong”*. Moreover, due to energy efficiency standard development, the latest GB 20665:2015 *“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”* is proposed to be adopted which is more specific than GB 6932:2015 as a test standard for measuring energy performance of gas instantaneous water heaters.
34. The proposed energy efficiency grade is determined by the thermal efficiency of the heater measured at 100% load and 50% load. For details of test requirements and determination of energy efficiency grading, please refer to Annex A.

Proposed Scope

35. Gas instantaneous water heater means a product–
- (a) that is a domestic gas appliance which is designed, or intended to be used primarily in domestic premises; and
  - (b) that –
    - (i) burns gas types defined in the Gas Safety Ordinance (Cap.51); and
    - (ii) has a rated power not exceeding 70kW.
36. Grading Scheme

Energy Efficiency Grade Thermal Efficiency (%)		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Measured at 100% load and 50% load:	$\eta_1$	≥ 92	≥ 89	≥ 86	≥ 83	< 83
$\eta_1$ : Thermal efficiency of higher value $\eta_2$ : Thermal efficiency of lower value	$\eta_2$	≥ 88	≥ 85	≥ 82	≥ 79	< 79

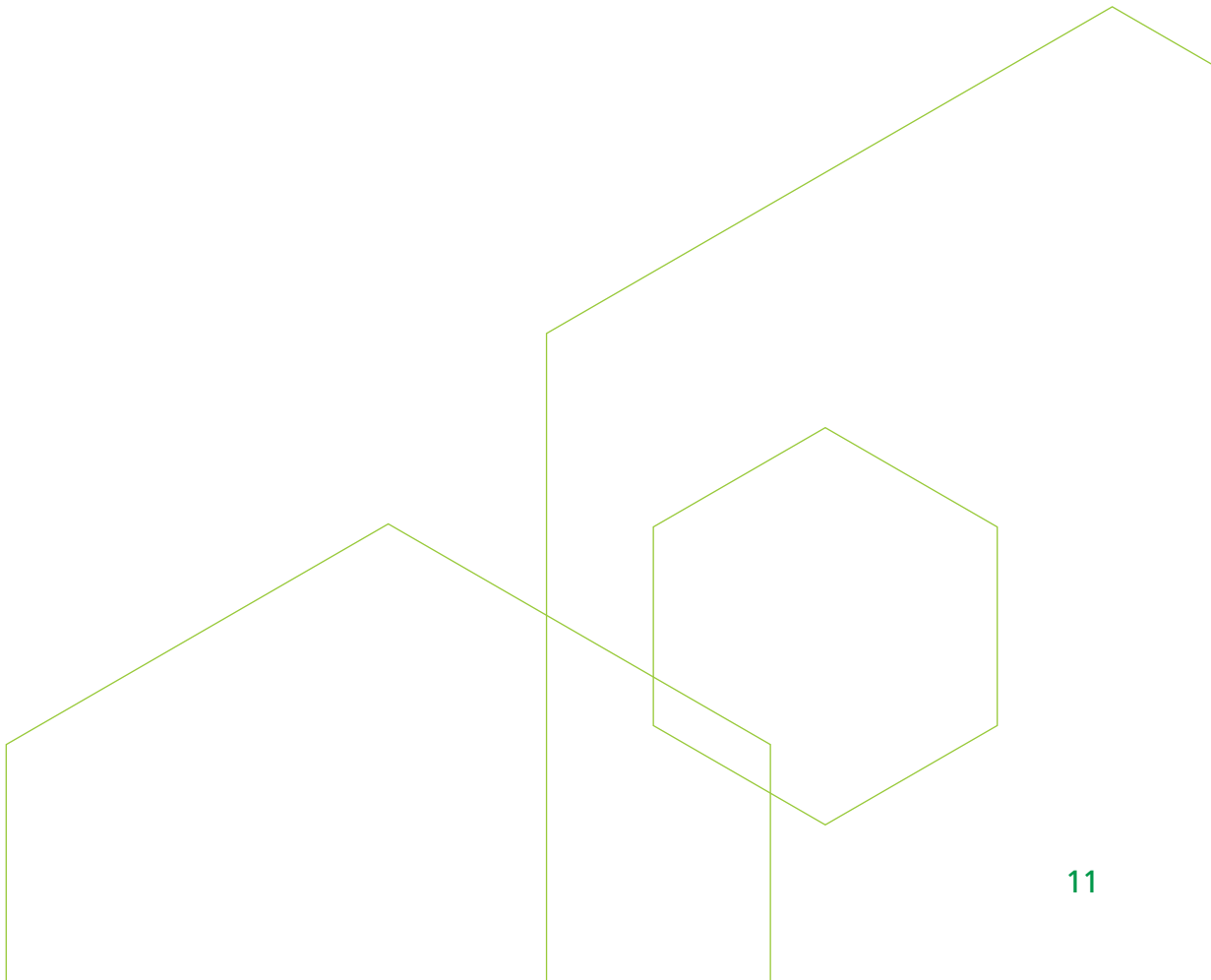
- When both  $\eta_1$  and  $\eta_2$  attain the same grade, the same energy efficiency grading of a gas instantaneous water heater will be assigned correspondingly.
- When  $\eta_1$  and  $\eta_2$  attain different grades, the lower energy efficiency grading of a gas instantaneous water heater will be assigned correspondingly.

37. The proposed energy label is “Grading Type” and similar to the current MEELS. There will be five energy efficiency grades, with Grade 1 being the most energy efficient and Grade 5 the least efficient. Please refer to Annex B for the proposed energy label sample.

#### Compliance

38. Compliance monitoring testing will be carried out regularly to check whether the gas instantaneous water heaters conform to the requirements. The conformance requirement is proposed as follows:

- The tested thermal efficiency shall not be lower than 97-98% of the measured value submitted in the application.



## 4 Transitional Arrangement

39. To enable the trade to make necessary preparation for the fourth phase of the MEELS, a transitional period of 18 months is proposed starting from the commencement of the fourth phase of the MEELS.

### Before the Commencement of the Fourth Phase of the MEELS – Exemption for Products

40. Following the similar practice under the first three phases of the MEELS, it is proposed to have the following exemptions for the fourth phase of the MEELS:

- (i) An exemption from information submission and labelling requirements would be given to gas cookers and gas instantaneous water heaters that manufactured in or imported into Hong Kong before the commencement date of the fourth phase of the MEELS.
- (ii) An exemption from information submission and labelling requirements would be given to prescribed products which are to be supplied as part of or in connection with the disposition of any newly developed premises and of which a procurement contract has been entered into before the commencement date of the fourth phase of the MEELS.

### On or After the Commencement of the Fourth Phase of the MEELS

41. Apart from the exempted products, manufacturers or importers are required to attach energy labels in the prescribed format specified in the Ordinance before supplying these new products in Hong Kong after the transitional period, such as models not registered under the VEELS.

### Transitional Arrangement for Product Models Registered under the Current Latest VEELS

42. During the transitional period, for product models which have already been registered under the current latest VEELS with the relevant test standards, their test results could be carried forward for a transition to the MEELS if:

- (i) For LED lamps, the product models have been registered under the VEELS for LED Lamps May 2020 edition or the latest edition.
- (ii) For gas cookers and gas instantaneous water heaters, the product models have been registered under the revamped VEELS<sup>5</sup> 2021 edition.

Such transitional arrangement does not apply to the product models which had been registered under the expired editions of the VEELS and manufactured in or imported into Hong Kong before the commencement date of the fourth phase of the MEELS. Hence, any supplier of such product models shall apply for a MEELS label for the product model concerned unless he and any person to whom he has supplied it no longer supplies it after the transitional period.

43. To avoid confusion to the public, the energy label of the VEELS should be removed from the product as soon as possible if the product model is registered under the MEELS.

<sup>5</sup> The VEELS for gas cookers and gas instantaneous water heaters are planned to be revamped in 2021 to adopt the proposed test standards and grading type labels.

## Full Implementation

44. Upon the end of the transition period of 18 months, energy labels shall be attached to the prescribed products in accordance with the Ordinance for supply in Hong Kong. The supply of prescribed products without reference number and energy label is prohibited.

## The Fourth Phase of the MEELS

### Before the commencement:

#### Products exempted from information submission and labelling requirements:

- i. Products manufactured in or imported into Hong Kong (for gas appliances only)
- ii. Products to be supplied as part of or in connection with the disposition of any newly developed premises and of which a procurement contract has been entered into



### Target Commencement in Q2 2023

### Transitional Period (18 months)

#### On or after the date of commencement:

- i. All newly prescribed products will be covered under the Ordinance
- ii. For models registered under the current latest VEELS with the relevant test standards, application shall be submitted for transition from the VEELS to the MEELS



### Full implementation

### Full implementation

Energy labels shall be attached to all newly prescribed products



## 5 Roadmap

45. For the implementation of the fourth phase of the MEELS, it is intended to revamp the VEELS of gas appliances to adopt the proposed testing standards (i.e. GB30720:2014 for gas cookers and GB20665:2015 for gas instantaneous water heaters). Stakeholders can be familiar with the requirements of the new revamped VEELS to allow a smooth transition from the VEELS to the MEELS.
46. The roadmap of the fourth phase of the MEELS is as follows:

Tasks		Anticipated Schedule
1.	Public consultation	Q1 2021 to Q2 2021
2.	(a) The VEELS for gas cookers and gas instantaneous water heaters will be revamped to adopt the new testing standards (i.e. GB30720:2014 for gas cookers and GB20665:2015 for gas instantaneous water heaters)	Q1 2021
	(b) Implementation of the revamped VEELS	Q2 2021
3.	Review of public consultation results	Q2 2021 to Q3 2021
4.	Amendment of the Ordinance for inclusion of new products	Q4 2021 to Q1 2023
5.	Commencement of the fourth phase of the MEELS with 18 months of transitional period	Q2 2023

## 6 Collection of Views

47. We invite your views and comments on the proposed products for the fourth phase of the MEELS. Please send in your completed response form (**Annex C**) on or before **31 May 2021** by mail, email or facsimile to the following:

<b>Mail:</b>	<b>Energy Efficiency Office</b> Electrical and Mechanical Services Department 3 Kai Shing Street Kowloon
<b>Email address:</b>	meels_review@emsd.gov.hk
<b>Facsimile:</b>	(852) 2890 6081

# Annex A

## Test Requirements and Determination of Energy Efficiency Grading for the Proposed Products of the Fourth Phase of the MEELS

### LED Lamps

#### Proposed Energy Performance Requirements

1. The required tests are tabulated below:

Tests Required	Measured Parameter	Acceptance Level
<b>i. Initial tests</b>	Luminous flux	The initial luminous flux of each individual LED lamp in the measured sample shall not be less than the rated luminous flux by more than 10%. The average initial luminous flux of the LED lamps in the measured sample shall not be less than the rated luminous flux by more than 7.5%.
	Lamp wattage	The initial power consumed by each individual LED lamp in the measured sample shall not exceed the rated power by more than 10%. The average of initial power consumed by the LED lamps in the measured sample shall not exceed the rated power by more than 7.5%.
	Colour rendering index	≥ 80
	Colour consistency	The variation of chromaticity coordinates shall be within a Six step MacAdam ellipse or less.
	Power factor	P ≤ 2 W: no requirement; 2W < P ≤ 5W: PF > 0.4; 5W < P ≤ 25W: PF > 0.5; and P > 25W: PF > 0.9
	Switching cycle	≥ 15 000 if rated lamp life ≥ 30 000 hours, otherwise ≥ half the rated lamp life expressed in hours.
<b>ii. Interim tests at 3 000 hours*</b>	Lamp survival factor	= 1
	Lumen maintenance	≥ 0.93
<b>iii. Tests at 6 000 hours</b>	Lamp survival factor	≥ 0.9
	Lumen maintenance	≥ 0.8

\* Remark: If a full test report is available, the person submitting the specified information of a product model can submit the full test report directly and does not need to submit the interim test report and the progress test report.

## Determination of Energy Efficiency Grading

2. The energy efficiency grade is proposed to be determined by the measured lamp luminous efficacy ( $E_m$ ) or the rated luminous efficacy ( $E_r$ ), whichever is smaller. The measured lamp luminous efficacy ( $E_m$ ) obtained in the test (refer to eq.1) shall be compared with the following rated lamp luminous efficacy ( $E_r$ ) which is determined and calculated based on the rated luminous flux and the rated wattage of the same product model (refer to eq.2).

$$\text{Measured Luminous Efficacy Efficacy } (E_m) = \frac{\text{Measured Luminous Flux}}{\text{Measured Wattage}} \dots\dots(\text{eq. 1})$$

$$\text{Rated Luminous Efficacy } (E_r) = \frac{\text{Rated Luminous Flux}}{\text{Rated Wattage}} \dots\dots(\text{eq. 2})$$



## Gas Cookers

### Proposed Energy Performance Requirements

- In general, two test pans of different sizes shall be selected according to the measured power of the burner in accordance with GB30720:2014. The larger one is called the upper limit pan and the smaller one is called the lower limit pan. Thermal efficiency test shall be carried out by using each test pan individually.

According to the test method in GB30720:2014, the measured thermal efficiency by using the upper limit pan is generally higher and that by using the lower limit pan is generally lower. The thermal efficiency of the burner shall be calculated by a linear interpolation between the two measured thermal efficiencies so as to attain a more precise thermal efficiency value of the burner.

### Determination of Energy Efficiency Grading

- Thermal efficiency test shall be carried out by using both the upper limit pan and the lower limit pan individually and calculated as below:

$$\eta = \frac{M \times c \times (t_2 - t_1)}{V \times Q} \times \frac{273 + t_g}{288} \times \frac{101.3}{P_{amb} + P_m - s} \times 100 \dots\dots(\text{eq. 3})$$

$$M = M_1 + 0.213M_2 \dots\dots(\text{eq. 4})$$

where

$\eta$	= Measured thermal efficiency (%);
$M$	= The value calculated in (eq. 4): the sum of (a) mass of water added and (b) mass of the aluminum test pan (kg);
$c$	= Specific heat capacity of water, i.e. $c = 4.19 \times 10^{-3} \text{ (MJ/(kg}\cdot\text{°C))}$ ;
$t_1$	= Initial water temperature (°C);
$t_2$	= Final water temperature (°C);
$V$	= Test gas consumed (m <sup>3</sup> );
$Q$	= Thermal input (NCV) of the test gas at 15°C, 101.3kPa (MJ/m <sup>3</sup> );
$t_g$	= Temperature of gas in the gas flow meter at the time of measurement (°C);
$P_{amb}$	= Atmospheric pressure at the time of measurement (kPa);
$P_m$	= Static pressure on the gas flow meter at the time of measurement (kPa);
$s$	= 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;
$M_1$	= Mass of the water added into the pan (kg); and
$M_2$	= Mass of the aluminum test pan (including the cover and the stirrer) (kg);

The calculation by interpolation of the thermal efficiency of a burner is as follows by using the upper limit pan and the lower limit pan:

$$\eta = \eta_{lower} + \frac{q_{lower} - 5.47}{q_{lower} - q_{upper}} \times (\eta_{upper} - \eta_{lower}) \dots\dots(\text{eq. 5})$$

where

- $\eta$  = Thermal efficiency (%);

---

- $\eta_{lower}$  = Measured thermal efficiency by using the lower limit pan (%);

---

- $\eta_{upper}$  = Measured thermal efficiency by using the upper limit pan (%);

---

- $q_{lower}$  = Thermal intensity\* at the bottom of the lower limit pan (W/cm<sup>2</sup>);

---

- $q_{upper}$  = Thermal intensity\* at the bottom of the upper limit pan (W/cm<sup>2</sup>).

---

\*Thermal intensity = measured power (W)/ area of the bottom of the test pan (cm<sup>2</sup>)

The proposed energy efficiency grade for a burner is determined by the thermal efficiency of the burner calculated in eq.5.



## Gas Instantaneous Water Heaters

### Proposed Energy Performance Requirements

5. Thermal efficiency tests shall be conducted at 100% load and 50% load condition. In general, heaters of combustion chamber designed with forced draft fan (i.e. blowing ambient air into the combustion chamber, which creates positive pressure) have a higher measured thermal efficiency at 50% load condition, whereas heaters of combustion chamber designed with induced draft fan (i.e. pulling flue air out from the combustion chamber, which creates negative pressure) have a higher measured thermal efficiency at 100% load condition. The proposed standard can better measure the energy performance of heaters of different designs.

### Determination of Energy Efficiency Grading

6. The proposed energy efficiency grade for gas instantaneous water heaters is determined according to the proposed test standard GB 20665:2015 which refers to the following equation from Table 26 in Section 7.19 of GB6932:2001:

$$\eta = \frac{M \times c \times (t_{w2} - t_{w1})}{V \times Q} \times \frac{273 + t_g}{273} \times \frac{101.3}{P_{amb} + P_g - S} \times 100 \dots\dots(\text{eq. 6})$$

where

$\eta$	= Thermal efficiency (%);
$c$	= Specific heat capacity of water, i.e. $c = 4.19 \times 10^{-3} \text{ (MJ/(kg} \cdot \text{°C))}$ ;
$M$	= Flow rate of hot water (kg/min);
$t_{w2}$	= Temperature of water outlet (°C);
$t_{w1}$	= Temperature of water inlet (°C);
$Q$	= Thermal input (NCV) of the test gas (MJ/m <sup>3</sup> );
$V$	= Flow rate of the test gas (m <sup>3</sup> /min);
$t_g$	= Temperature of gas in the gas flow meter at the time of measurement (°C);
$P_{amb}$	= Atmospheric pressure during testing (kPa);
$P_g$	= Gas pressure measured by the gas flow meter during testing (kPa);
$S$	= 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;

## Conditions of the Test Gases Used for the Testing of Gas Cookers and Gas Instantaneous Water Heaters

7. The composition of standard test gases (i.e. town gas and liquefied petroleum gas (LPG)) is tabulated below and these gases are defined as the reference gases for the testing of Hong Kong gas appliances:

Reference gases	Composition (% by volume)	Wobbe Index (MJ/m <sup>3</sup> ) (GCV) <sup>6</sup>
Town gas	H <sub>2</sub> : 50.5%, CH <sub>4</sub> : 29.2%, CO <sub>2</sub> : 17.4%, CO: 1.2%, Air: 1.7%	24.65
LPG	C <sub>3</sub> H <sub>8</sub> : 30%, C <sub>4</sub> H <sub>10</sub> : 70%	84.17

In accordance with GB standards, the Wobbe Index of the test gas actually used in laboratory shall be within a tolerance of  $\pm 2\%$  as compared to the Wobbe Index of the reference gas.

8. Tests are to be carried out with the test gases (i.e. town gas and LPG) at the nominal pressure given in the table below:

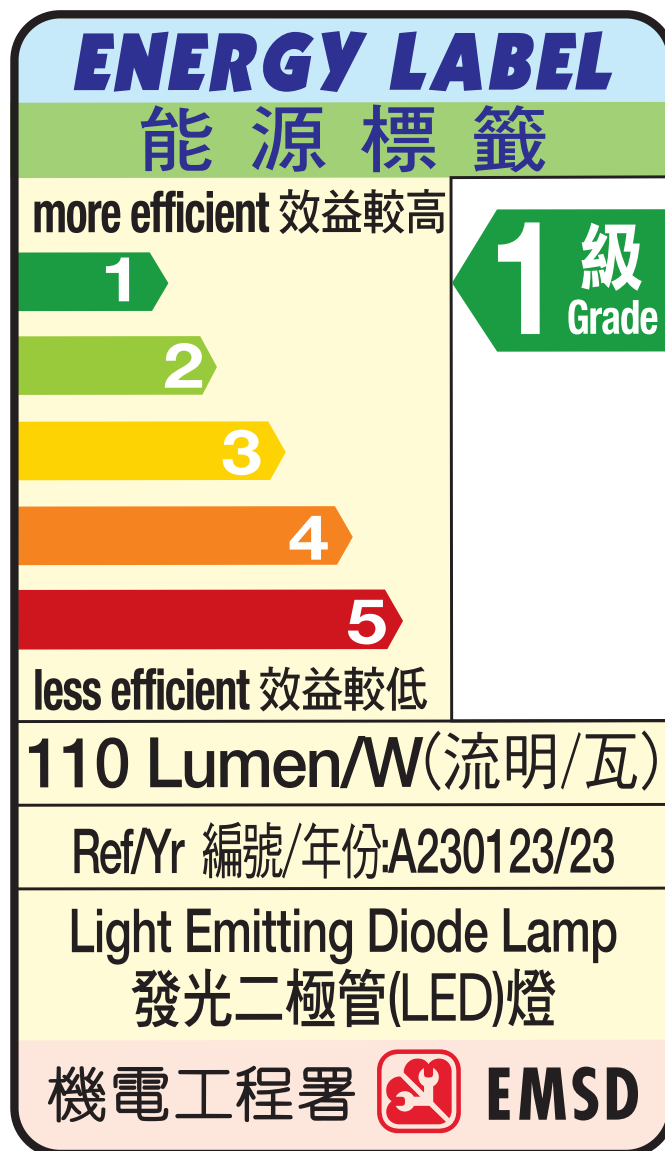
Types of test gas	Test pressure (kPa)		
	Minimum	Nominal	Maximum
Town gas	0.75	1.5	2.0
LPG	2.0	2.9	3.5

<sup>6</sup> Wobbe Index value is calculated in accordance with GB standard, GB/T 13611-2018, at 15°C, 101.325kPa and the values are for reference only.



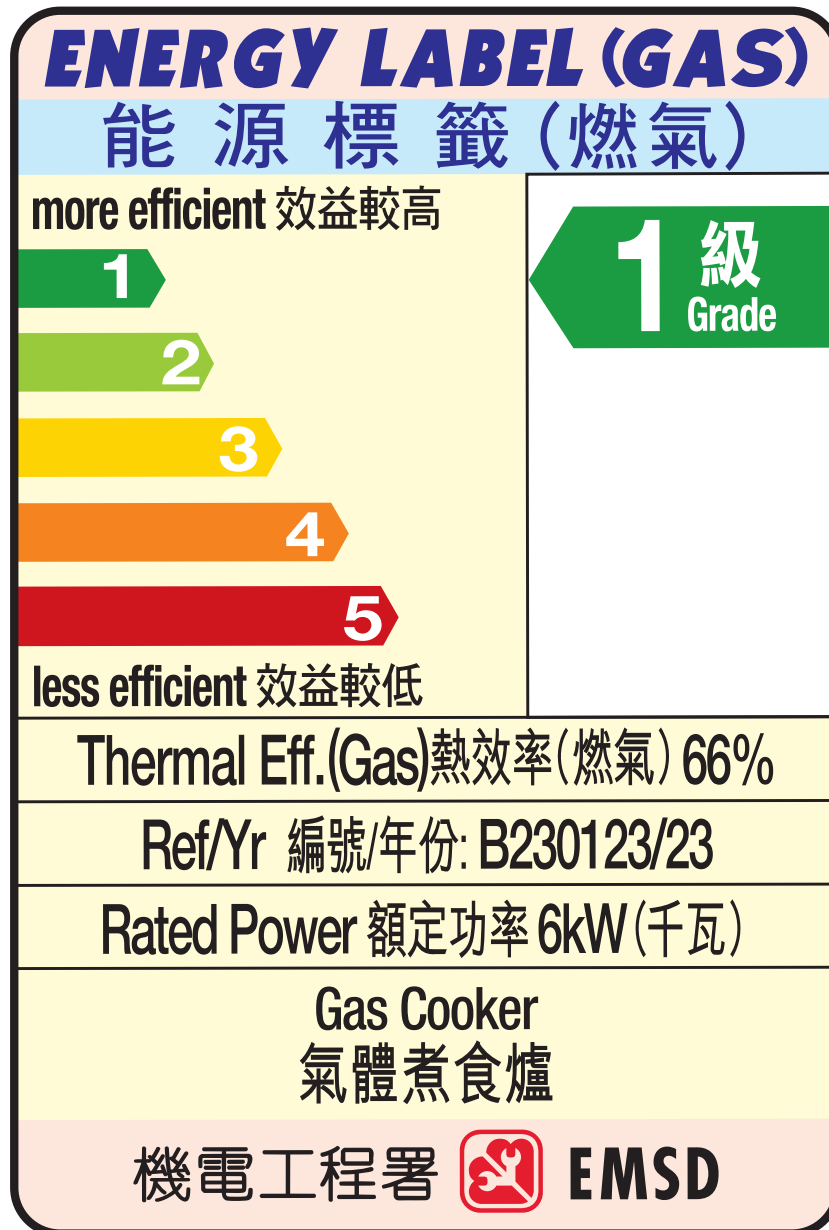
# Annex B Proposed Energy Label Samples

## LED Lamps



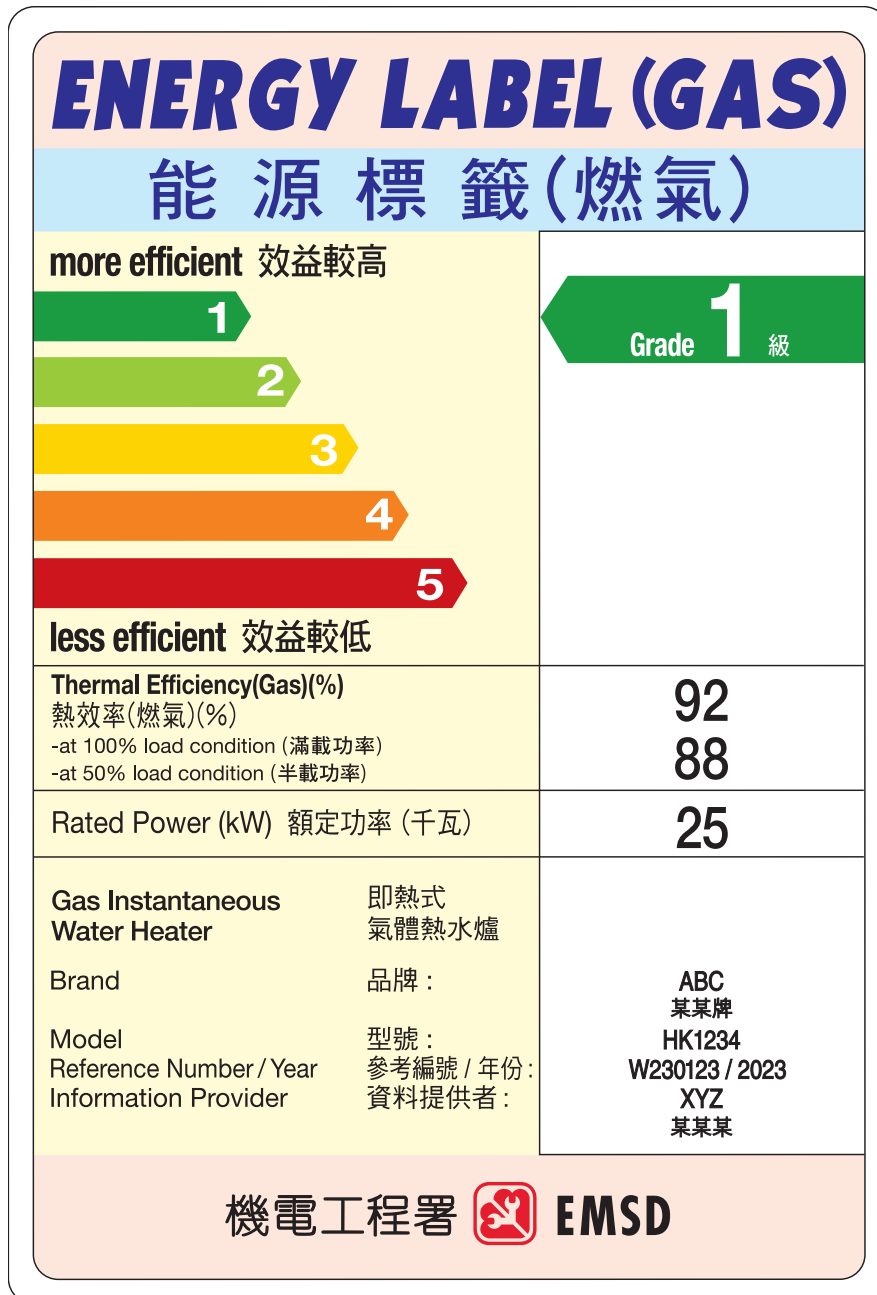
Proposed energy label sample for LED lamps

## Gas Cookers



Proposed energy label sample for gas cookers

## Gas Instantaneous Water Heaters



Proposed energy label sample for gas instantaneous water heaters

# Annex C

**Energy Efficiency Office**

Email: meels\_review@emsd.gov.hk

**Electrical and Mechanical Services Department** Fax: (852) 2890 6081

3 Kai Shing Street

Kowloon

## Response Form: New Products under the Fourth Phase of the MEELS

My views on the following issues are set out below:

1. Other product(s) to be included in the MEELS:

---

---

Remark: please tick ✓ the appropriate box (  ) for questions 2 to 14

2. If LED lamps are included in the MEELS, what information should the energy label include?
  - (1) Rated efficacy (Lumen/W)
  - (2) Rated power (kW)
  - (3) Rated lamp life (hours) (1), (2) and (3)  
 (1) and (2) only  
 (1) only
3. To apply for the LED lamp energy label, are interim test reports and progress test reports required to be submitted by the trade?  
 Yes  
 No
4. Do you agree that white tunable LED lamps should be included in the MEELS?  
 Yes  
 No, reason: \_\_\_\_\_
5. If gas cookers are included in the MEELS, what should the scope of power rating coverage be? (may tick more than one box)  
 Burner with rated power  $\leq$  5.92 kW  
 Burner with rated power between 5.92 and 7 kW  
 Burner with rated power  $>$  7 kW

6. What products should be included in the scope of coverage for gas cookers?
- (1) Table-top type and built-in type with burners only
  - (2) Hybrid type\* (i.e. hotplate with rice cookers, burners top plus ovens, etc.)  
(\*only the energy efficiency performance of the burners will be assessed according to the proposed test standard, i.e. GB30720-2014)
- (1) only
- Both (1) and (2)
7. With reference to the mandatory labelling schemes of some economies such as the Mainland of China and Taiwan, China, the energy label for gas cookers is proposed to contain information of thermal efficiency (%) and rated power (kW) so that consumers can easily compare the energy efficiency performance of different product models. What information should the energy label for gas cookers include?
- (1) Thermal efficiency (gas) (%)
  - (2) Rated power (kW)
  - (3) Table-top type / built-in type
- (1), (2) and (3)
- (1) and (2) only
- (1) only
8. If gas cookers are included in the MEELS, what should the tolerance level of the tested thermal efficiency for the compliance monitoring test be?
- The tested thermal efficiency shall not be less than \_\_ (choose from below) of the measured values submitted in the application for the MEELS.
- 98%
- 97%
- 96%
- 95%
- 94%
9. With reference to the mandatory labelling schemes of some economies such as the Mainland of China and Taiwan, China, the energy label for gas instantaneous water heaters is proposed to contain information of thermal efficiency (%) and rated power (kW) so that consumers can easily compare the energy efficiency performance of different product models. If gas instantaneous water heaters are included in the MEELS, what information should the energy label include?
- (1) Thermal efficiency (gas) (%) at 100% and 50% load conditions
  - (2) Rated power (kW)
  - (3) Hot water supply (temperature rise, L/min)
- (1), (2) and (3)
- (1) and (2) only
- (1) only

10. If gas instantaneous water heaters are included in the MEELS, what should the tolerance level of tested thermal efficiency for the compliance monitoring test be?

The tested thermal efficiency shall not be less than \_\_\_ (choose from below) of the measured values submitted in the application for the MEELS.

- 98%
- 97%

11. In order to facilitate the trade to familiarise with the new energy efficiency requirements of the gas appliances in the MEELS, the Voluntary Energy Efficiency Labelling Scheme (VEELS) for gas cookers and gas instantaneous water heaters will be revamped according to the energy efficiency requirement of the MEELS at least a year ahead of the implementation of the fourth phase of the MEELS. In view of early implementation of the VEELS revamp, how long should the grace period of the fourth phase of the MEELS be?

- 6 months
- 12 months
- 18 months

12. If gas appliances are included in the MEELS, what is your expected acceptable energy efficiency grade of the gas appliances for the general public?

- Grade 1 only
- Grade 1, 2 and 3 are acceptable
- All grades are acceptable provided that the energy label is available

(For importers of gas appliances)

13. For gas cookers, what is the percentage share of the active models your company has been handling for sales and distribution in Hong Kong market? (may tick more than one box)

- Table-top type, imported from the Mainland of China: \_\_\_\_\_%
- Built-in type, imported from the Mainland of China: \_\_\_\_\_%
- Table-top type, imported from Japan / Taiwan, China: \_\_\_\_\_%
- Built-in type, imported from Japan / Taiwan, China: \_\_\_\_\_%
- Table-top type, imported from other countries: \_\_\_\_\_%
- Built-in type, imported from other countries: \_\_\_\_\_%

14. Based on Q13, what is the expected time required to replace the current stock with products that can attain energy efficiency grading at Grade 1?

- 2 years
- 3 years
- 4 years
- 5 years or more

Other comments:

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Company (Optional):	_____	Date:	_____
Name of Person (Optional):	_____	Email:	_____
Position (Optional):	_____	Fax:	_____
Telephone:	_____		
Address:	_____		
	_____		

## PERSONAL DATA COLLECTION STATEMENT

1. The Electrical and Mechanical Services Department respects personal data privacy and is committed to implementing and complying with the data protection principles and relevant provisions under the Personal Data (Privacy) Ordinance.
2. It is voluntary for any member of the public to supply his/her personal data upon providing views on the consultation document. Any personal data provided with a response form for consultation will only be used for this consultation exercise. The response forms and personal data collected may be transferred to the relevant Government bureaux, departments or agencies for purposes directly related to this consultation exercise. The relevant parties receiving the data are bound by such purposes in their subsequent use of such data.
3. The Electrical and Mechanical Services Department may, either in discussion with others or in any subsequent report, whether privately or publicly, attribute comments submitted in response to the consultation document. We will respect the wish of senders to remain anonymous and/or keep the views confidential in relation to all or part of a submission; but if no such wish is indicated, it will be assumed that the sender can be named and his/her views can be disclosed and/or published for public information.
4. Any sender providing personal data to the Electrical and Mechanical Services Department in the submission will have the right of access and correction with respect to such personal data. Any request for data access or correction of personal data should be made in writing to the contact specified above.



Energy Efficiency  **EMSD**

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