Suruhanjaya Tenaga
Energy Commission

GUIDE ON MINIMUM ENERGY PERFORMANCE STANDARDS FOR FREEZER

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1. OBJECTIVE

1.1. This Guide is developed by the Commission to specify the MEPS and energy labeling requirements for freezer that can be connected to mains power and for household use.

2. SCOPE

2.1. Subject to paragraph 2.2, this Guide shall apply to the following function of freezer with size up to or equal to 320 L:

(a) chest with solid door;

2.2. The following products and technologies are excluded from this Guide:

(a) any freezer model(s) that have been granted exemption by the Commission.

2.3. This Guide does not specify the procedure for the application of a COA. For further information regarding the application of a COA, please visit www.st.gov.my.

2.4. This Guide is not intended in any way to circumvent the application of and obligations or requirements under any other written law or standards. Parties relying on this Guide are advised to obtain independent advice on the applicability of the same to their equipment.

3. DEFINITIONS AND INTERPRETATION

3.1. In this Guide, the following terms shall bear the following meanings:

"Act"	means the Electricity Supply Act 1990 [*Act 447*], as amended, modified or supplemented from time to time;
"CAB"	means a conformity assessment body recognised by the Commission;
"COA"	means the Certificate of Approval issued in accordance with Regulation 97 of the Electricity Regulations 1994,

	as amended, modified or supplemented from time to time;
"Commission"	means Suruhanjaya Tenaga;
"Energy Laws"	means the Act and all subsidiary legislations made thereunder;
"EEF"	Energy efficiency factor is a ratio between adjusted volume in litres and energy consumption per day in kWh obtained using the test method as in IEC 62552-3:2015/AMD1:2020
"EEFaverage"	EEFAverage is energy efficiency factor that is determined through local market survey.
"$EEF_{lowest2\text{-}Stars\ model}$"	means the energy efficiency factor for 2-star freezer models determined through local market survey and is a value that is determined and published by the Commission from time to time; and
"EEF_{tested}"	means the energy efficiency factor for each individual freezer model and is a value obtained from the relevant test report;
"MEPS"	means minimum energy performance standards, which is the minimum level of energy efficiency which has to be met by an appliance;
"Star Index"	An indication of the claimed energy efficiency of a model. A higher SRI indicates higher energy efficiency. It is derived from the energy efficiency factor (EEF).
"test report"	means a test report issued by a CAB.

3.2. Subject to paragraph 3.1 and unless expressly indicated to the contrary or unless the context otherwise requires, terms adopted and used in this Guide shall bear the same meaning as they are defined in the Energy Laws.

3.3. If there are any conflict between the provisions of this Guide and of those contained in the Energy Laws, the provisions in the Energy Laws shall prevail.

4. TESTING STANDARD

4.1. The following testing standard references are indispensable for the application of this Guide. For dated references, only the edition cited applies:

(i) IEC 62552-1:2015/AMD1:2020 Household refrigerating appliances – Characteristics and test methods -Part 1 : General requirements

(ii) IEC 62552-3:2015/AMD1:2020 Household refrigerating appliances – Characteristics and test methods -Part 3 : Energy consumption and volume

5. STAR INDEX

5.1 Star index is determined based on daily energy consumption obtained from test conducted in accordance with IEC 62552-1:2015/AMD1:2020 and IEC 62552-3:2015/AMD1:2020. The example calculation of Star Index value can be found in Annex A.

Star index is determined by the following equation:

$$Star\ Index = \left[\frac{EEF_{Tested}}{EEF_{Average}} - 1\right] \times 100\%$$

where energy efficiency factor is determined by the following equation:

$$EEF_{Tested} = \frac{V_{adjusted}\ (L)}{Energy\ consumptioned\ per\ day\ (kWh)}$$

$$Energy\ consumption\ per\ day = \frac{E_{Total}}{365}$$

where

$$E_{Total} = E_{daily32C} \times 365 + \Delta E_{processing3} \quad \times 365.$$

The adjusted volume ($V_{adjusted}$) of a refrigerating appliance is calculated by summing the adjusted volume for each compartment as per equation below:

$$V_{adj} = \sum_{i=1}^{n} K_{ci} \times V_i$$

where

n is number of compartments in the refrigerating appliance

V_i is volume of compartment *i* (litres)

K_{ci} is adjustment volume factor for compartment *i* as determined in accordance with the following equation.

$$K_{ci} = \frac{[T_{ka} - T_{ti}]}{[T_{ka} - T_{tff}]}$$

Where,

T_{ka} is the environment test temperature (set at + 32±0.5 ºC);

T_{ti} is the target temperature of compartment *i* (°C) from Table 2

T_{tff} is the target temperature of a fresh food compartment (4 °C)

The volume adjustment factor (K_{ci}) for each compartment type is specified in Table 2 below.

Table 1: Volume adjustment factor

Compartment type	Target temperature (°C)	Volume adjustment factor (K_{ci})
1 star	-6	1.36
2 star	-12	1.57
3 star and 4 star	-18	1.79

6. MEASUREMENT CONDITIONS

6.1 General

The energy consumption shall be determined by interpolation from the results of two tests: one giving a temperature warmer than, and the other a temperature colder than, the target temperature as in accordance with IEC 62552-3:2015/AMD1:2020

6.2 Electricity Supply

The refrigerating appliance shall be tested at the 230V, 50Hz.

6.3 Ambient Temperature and Humidity

Ambient temperature of 32 ±0.5 ºC ,with humidity less than 75%

6.4 Load processing efficiency

This value is determined by using equation (57) of Annex G of IEC 62552-3:2015/AMD1:2020. This value is determined at ambient temperature of 32±0.5 ºC only. A regional factor to scale processing load used is 1.

Note: In the case of major changes of the any component related to performance of the freezer i.e. compressor, evaporator, condenser, PCB Board, defrost heater, fan motor etc. the freezer shall be tested again.

7. STAR RATING

7.1. The star rating shall be in accordance with Table 1 below:

Star rating	Star index value
5	+ 35 % ≤ Star index
4	+ 15 % ≤ Star index < + 35 %
3	- 20 % ≤ Star index < + 15 %
2	- 37 % ≤ Star index < - 20 %
1	Star index < - 37 %

Table 1 : Star Rating

Note : Star Rating will be given by certification body appointed by the Commission in the test report or assessment letter

8. MEPS REQUIREMENT

A COA will only be issued upon fulfillment of all of the following requirements:

8.1. The MEPS rating to be achieved shall be 2-Star.

9. ENERGY EFFICIENCY LABEL

9.1. In accordance with the Energy Laws, any equipment that meets all the requirements of efficient use of electricity shall be affixed with an efficiency rating label. It shall be the responsibility of the manufacturer or importer to affix such label.

9.2. Information to be included in the label is as per Figure 1.

Figure 1

9.3. Calculation Method

In order to obtain the value of “energy savings compared to the lowest 2-Star rated product (in percentage)”, the following formula shall be applied:

Annual Energy Consumption (kWh)= E_{Total} (Obtained From the Test Report)

Percentage energy saving compared to the lowest 2 star rating model

$$100\ \% - \left[100 \times \left(\frac{EEF_{\text{lowest2-Stars model}}}{EEF_{\text{testedl}}} \right) \right]$$

For the avoidance of doubt, the word “product” on the energy efficient label refers to an equipment as defined in the Energy Laws.

Note : Calculation will be given by certification body appointed by the Commission in the test report or assessment letter

9.4. Size Specification : The size of the energy efficiency label is as per Figure 2.

Figure 2

9.5. Font Specification : The type and minimum size of the font for the energy efficiency label is as per Figure 3.

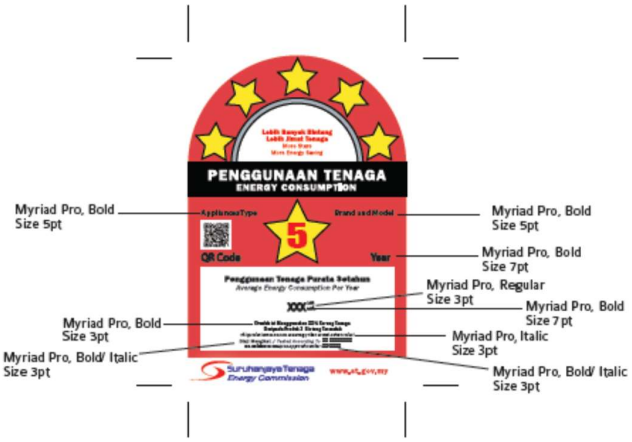

Figure 3

9.6. Colour Specifications : The energy efficiency label shall be printed according to the colour specifications in Figure 4.

Figure 4

9.7. Design Specification : The designs for the energy efficiency label for each star rating is as per Figure 5.

Figure 5

9.8 Location : The location for energy efficient label to be affixed on the product as shown in the Figure 6

Figure 6

A softcopy of energy efficiency label in AI format can be obtained from the Commission by emailing meps@st.gov.my with a request.