



Revision 2
Date: 8th September, 2021

SCHEDULE – 25

DEEP FREEZERS

1. Scope:

1.1 This schedule specifies the safety and performance requirements for participating in the energy labelling program for deep freezers based on vapor compression working principle. It covers deep freezers of top access type, basically the chest freezers having a storage volume up to and including 1000 liters, with both hard top and glass top (sliding, hinged and curved) and their rated voltage not exceeding 250 V ac 50 Hz for single phase and 415 V ac 50 Hz for three phase ac, as specified under the scope of IS 7872 with all amendments.

2. Normative Reference: This schedule shall be read in conjunction with IS 7872 with all the amendments.

3. Terms and Definitions: For the purposes of this schedule, the following definitions in additions to those given in IS 7872 with all the amendments shall apply.

3.1 Food Freezer: A thermally insulated cabinet which is intended for storing of frozen food for storage application when the food is brought in at same or lower temperature than -18 °C.

3.2 Top Access type Deep Freezer: A food freezer in which the storage compartment(s) is (are) accessible from the top.

3.3 Energy consumption: For determining the energy consumption of a Deep Freezer, the unit shall be operated for 6 h and energy consumption shall be calculated for 24 h duration in accordance with the test procedure laid out in the latest version of IS 7872 with all amendments.

3.4 Annual Energy Consumption (AEC): The energy (in kWh) consumed by a unit per annum. This can be calculated using the formula given below:

Annual Energy Consumption (AEC), kWh/ year = 24-hour Energy Consumption * 365

Note: 24-hour energy consumption shall be calculated by operating the unit for 6 h.



3.5 Storage Volume (V), in liters: The storage volume shall be the gross volume or sum of the gross volumes of individual compartments less the volumes of internal fittings fixed in the cabinet and the volumes of the shelves, partitions and baskets essential which are assembled with tools for the proper operation of the cabinet . Storage Volume (shall be calculated in accordance with test procedure laid out in IS 7872 with all amendments).

3.6 Star Rating: The number of stars displayed on the energy label. The available stars are between a minimum of one and a maximum of five shown in one-star interval. The star rating is calculated from the Star Rating Band. The Star Rating determination will vary for different models based on the storage volume.

3.7 Star Rating Band: The Star Rating Band is a range of annual energy consumption (kWh/Year) which is arrived at by calculations and is used for determining the number of stars to be displayed on the energy label.

3.8 Label Period: It is the label validity period of the energy consumption standards provided under the star rating plan as specified in the schedule.

3.9 Family of models: It is the range of models of a particular brand, to which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, annual energy consumption, star rating and other performance characteristics.

3.10 Hard top Chest freezers: It is the range of top access type deep freezer models, which have an opaque door, which is generally same as the material of the body.

3.11 Glass top Chest freezers: It is the range of top access type deep freezer models, which have a hard glass door flat, curved or with a sliding mechanism enabling the customers to view the products without opening the door

4. Testing Guidelines:

The tests specified in this schedule shall be carried out as per IS 7872 with all amendments. The testing guideline for each of the performance parameters is mentioned below.

4.1 Testing parameters:

4.1.1 Safety parameters (in accordance with IS/IEC 60335-2-89) - Clause 6 of IS 7872 with all amendments:

- (i) Leakage current (clause 13.2)
- (ii) Creepage distance (clause 29)
- (iii) Earthing connection (clause 27)



- (iv) High voltage (clause 13.3)
- (v) Protection against electric shock (clause 8)

Note: Regarding clause 27 and 29, we should refer the complete clause reference instead of sub-clause as the product should meet all the sub-clauses relevant to the product.

4.1.2 Performance parameters (in accordance with IS 7872 with all amendments):

- (i) Pull down time
- (ii) No load Energy consumption
- (iii) Storage volume

4.2 Testing conditions: All testing conditions shall be in accordance with IS 7872 with all amendments. .

5. Test Report: The results of test shall be reported in the prescribed format as given in Annexure I of this Schedule.

5.1 Rounding off: The test values shall be rounded off to the respective significant figures as per IS 2:1960.

5.2 Sample Size: For the purpose of carrying out the safety and performance tests, following sample size quantity shall be taken:

5.2.1 Safety Tests: For determining compliance to the safety parameters mentioned in clause 4.1.1 of this Schedule, **only one sample per test is required.**

5.2.2 Performance Tests: For determining the performance of the product with respect to the performance parameters mentioned in clause 4.1.2 of this Schedule, **3 samples per test are required.**

6. Tolerance Limit:

The tolerance limits for the performance parameters shall be in accordance with IS 7872 with all amendments, i.e.

6.1 On Volume: $\pm 3\%$

6.2 On Annual Energy Consumption: 10 % (Declared Annual Energy Consumption shall be less than or equal to 1.1 * Measured Annual Energy Consumption)

7. Star Rating Plan: The star rating parameters K_{dc} (Constant Multiplier (kWh/litre/Year) & C_{dc} (Constant Fixed Allowance (kWh/Year)) shall be obtained from Table 7.1 or 7.2 depending on type of chest freezer i.e. Hard top or Glass top



S.No.	Type of Deep Freezer	Table to be used
1	Hard Top Chest Freezers	7.1
2	Glass Top Chest Freezers	7.2

The following equation shall be used to determine the Star Rating Bands for a particular model:

$$\text{Star Rating Band (SRB)} = K_{dc} * V + C_{dc}$$

Where,

K_{dc} = Constant Multiplier (kWh/Liter/Year)

V = Storage Volume (Liter)

C_{dc} = Constant Fixed Allowance (kWh/Year)

Table 7.1 Star Rating Band for Hard Top type Chest Freezers Valid from 1st April, 2020 to 31st December, 2022	
Star rating	Annual Energy Consumption (E_t) in kWh/year at 38 °C
1 Star *	$4.23*V + 126.65 \leq AEC < 5.07*V + 151.98$
2 Star **	$3.52*V + 105.54 \leq AEC < 4.23*V + 126.65$
3 Star ***	$2.82*V + 84.43 \leq AEC < 3.52*V + 105.54$
4 Star ****	$2.25*V + 67.55 \leq AEC < 2.82*V + 84.43$
5 Star *****	$AEC < 2.25*V + 67.55$

Table 7.2 Star Rating Band for Glass Top type Chest Freezers Valid from 1st April, 2020 to 31st December, 2022	
Star rating	Annual Energy Consumption (E_t) in kWh/year at 38 °C
1 Star *	$7.68*V + 511.17 \leq AEC < 9.21*V + 613.40$
2 Star **	$6.40*V + 425.97 \leq AEC < 7.68*V + 511.17$
3 Star ***	$5.12*V + 340.78 \leq AEC < 6.40*V + 425.97$
4 Star ****	$4.09*V + 272.62 \leq AEC < 5.12*V + 340.78$
5 Star *****	$AEC < 4.09*V + 272.62$

7.1 The Annual Energy Consumption (AEC) of the hard top/glass top model as defined under



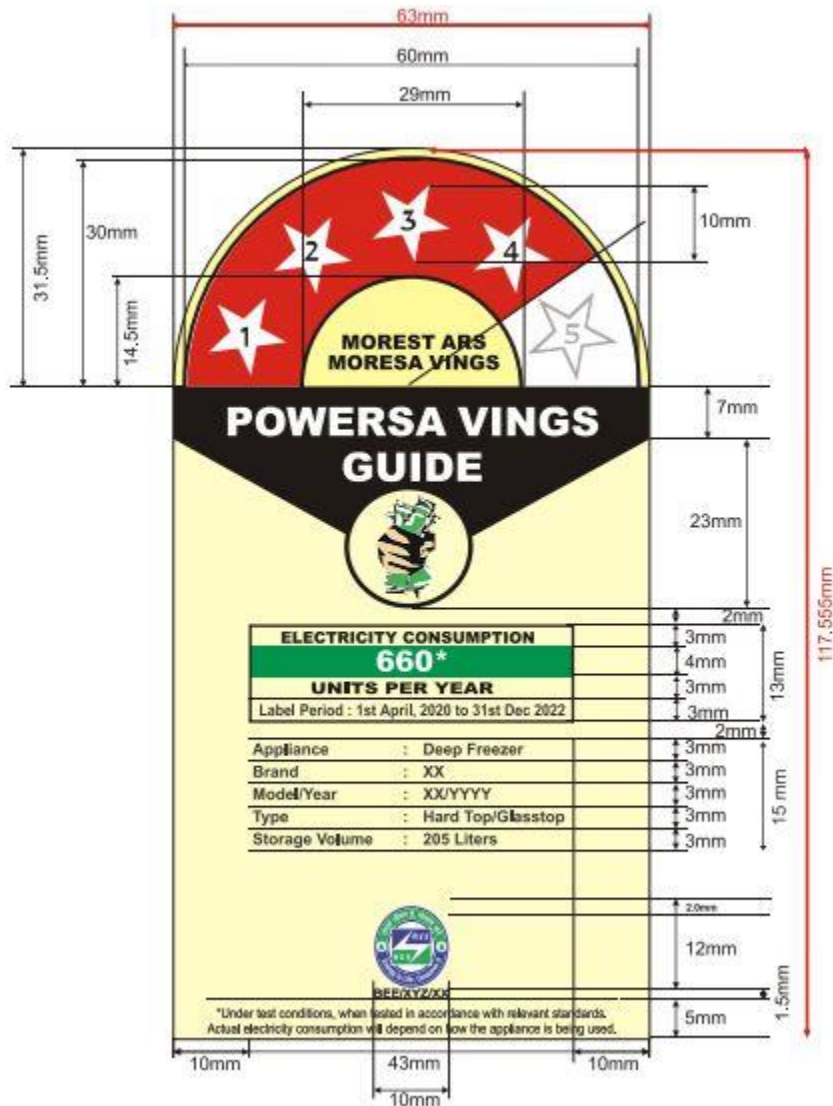
clause 3.4 shall be compared with the Annual Energy Consumption for various Star Rating Bands as given in Table 7.1 or 7.2 respectively.

7.2 There shall be no tolerance for the Star Rating Bands and all tested products shall meet minimum threshold limit for each Star Rating Band.

7.3 Star rating validity (i.e. For Check & challenge testing): The Annual Energy Consumption (AEC) value shall be accepted as valid, when each unit's measured energy consumption shall be less than or equal to the declared Annual Energy Consumption (AEC).

8. Label Design and Manner of Display:

8.1 Material & Dimension of Label: The label shall be self –adhesive and shall be designed as set out in sample label.



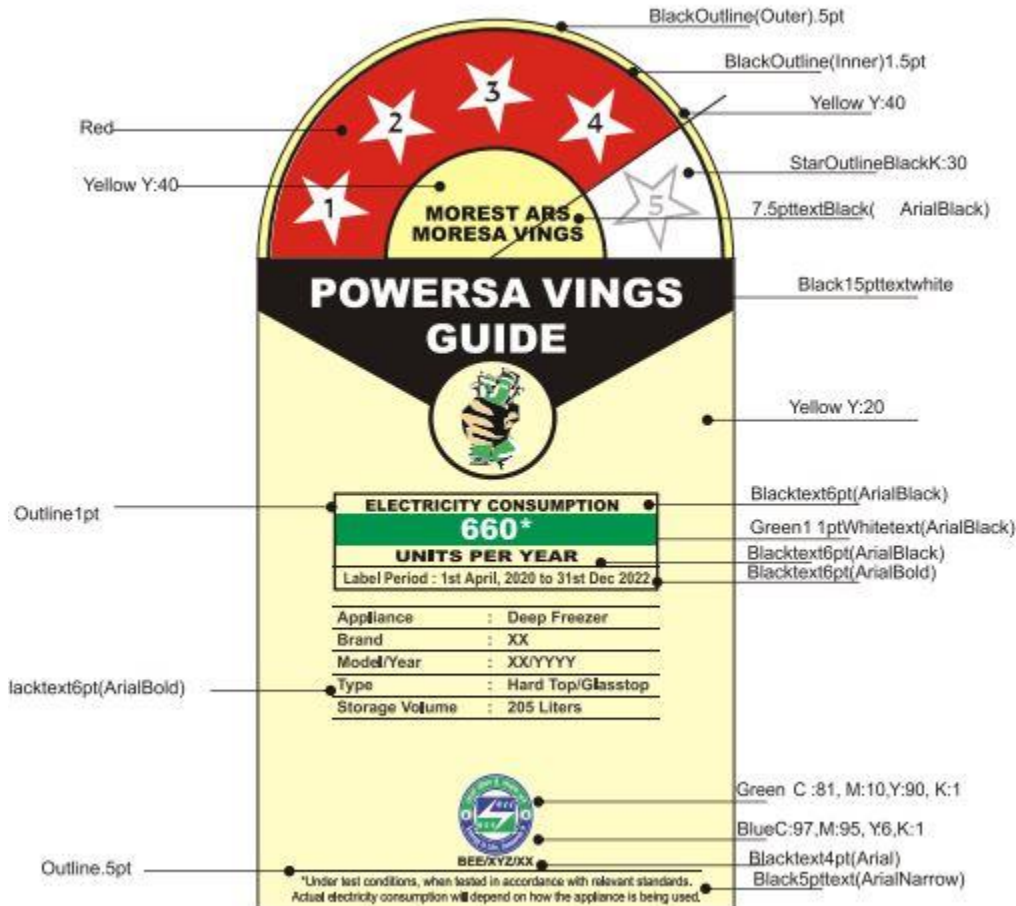
8.2 Color scheme of label: The label shall be printed as per the following specification in the following colors on a white background:

- Red: Pantone warm red
- Yellow: Pantone 116
- Black: Pantone Black
- Green: Pantone 340

The following color scheme for Bureau's logo, namely: -



- a. BLUE – Hue(H)-239o Saturation(S):64% Brightness(B):59%
- b. Luminance or lightness(L) :28, chromatic components -a:24 b:54
- c. Red(R):54 Green(G):55 Blue(B):151
- d. Cyan(C):97% Magenta(M):95% Yellow(Y):6% Black(K):1%
- e. Web color code - #363797
- f. GREEN – Hue(H)-150o Saturation(S):10% Brightness(B):67%
- g. Luminance or lightness(L) :61, chromatic components -a: -53 b:32
- h. Red(R):0 Green(G):170 Blue(B):87
- i. Cyan(C):81% Magenta(M):10% Yellow(Y):90% Black(K):1%
- j. Web color code - #00AA56;



Note: The color tone at the background of Electricity Consumption Display (Green) will be similar as followed for the Bureau of Energy Efficiency Logo.

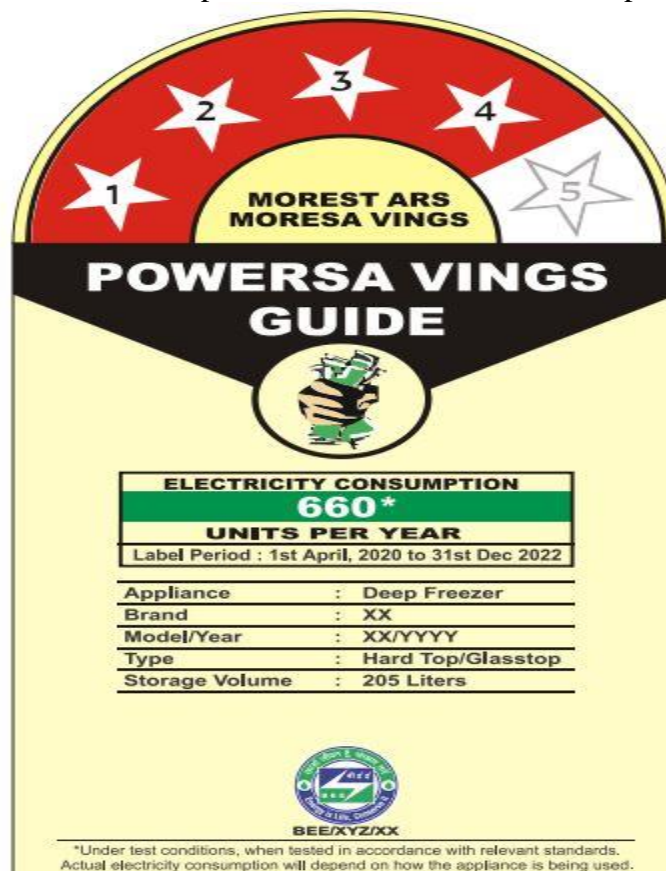


8.3 Position of label (Placement): The energy label shall be adhered to the upper right portion of each appliance on the outside of the door.

8.4 Content of Label: The label will mention the following:

- Star level
- Electricity Consumption per Year
- Label Period
- Appliance: Top access deep freezer
- Brand
- Model Name/Number
- Year of Manufacturing
- Type : Hard Top / Glass Top
- Storage Volume
- BEE-logo
- Unique Series code

8.5 A typical example of how a sample label would look like for Deep Freezers is:





9. Fees

9.1 Security Deposit: The user of label with respect to each equipment shall deposit a security deposit of Rs 1 lakh (**for large scale industries**) or twenty-five thousand (**for small and medium scale industries**) along with the application for seeking authority to use label.

9.2 Model Registration fee: This fee is payable on application for assignment of authority is Rs. 2000 (Two thousand only).

9.3 Renewal fee: This is payable on application for model renewal of authority is INR 1000 (One thousand only).

9.4 Labeling fee: For affixation of label on each piece of chest freezer is INR 5 (Five only).

10. Check Testing: Check testing of the product shall be carried out as described in the operations manual of BEE's S&L program wherein the overall procedure shall be the same as followed for Star labelled Refrigerators.

Annexure 1 Form for reporting the test results

The results of tests shall be reported as per IS 7872 with all amendments with the relevant sections from the mentioned appendix applicable and will clearly mention the following:

1. Details of the chest freezer

- (i) Appliance: Deep Freezer
- (ii) Brand:
- (iii) Type: Hard top / Glass top Type Deep Freezer
- (iv) Model name/number:
- (v) Rated voltage / frequency / no. of phase:
- (vi) Rated Storage Volume (Liters):
- (vii) Electricity Consumption per year (KWh/year):

2. Complete and attach a separate copy of the particulars below for each test type, as applicable:

- (i) Date of test:
- (ii) Test officer:
- (iii) Test type:
- (iv) Ambient test conditions:



(v) Test Standard:

3. Test summary Safety Tests

Parameters	Specification	Observation
Leakage Current test		
Creepage distance		
Earthing Connection		
High voltage		
Protection against electric shock		

Performance tests

(i) Energy consumption test (to be submitted for each of 3 units tested)

Parameters	Rated/Declared Value	Measured Value
Temperature of Freezer Compartment 1 (Deg.C)		
Temperature of Freezer Compartment 2 (Deg.C)		
Temperature of Freezer Compartment if more than 2 (Deg.C)		
Average Temperature of Freezer Compartment		
Energy Meter Reading (Wh)		
Percentage running time (Hrs.)		
Energy Consumption rate per day (Wh/Day)		
Measured Annual Energy Consumption (kWh/year)		
Declared Annual Energy Consumption (kWh/year)		

(ii) The Pull-down temperature test (to be submitted for each of 3 unit tested):

Ambient test condition:

Observations and Results:

Parameters	Rated/Declared Value	Measured Value
Temperature of Freezer Compartment(F1)		



Parameters	Rated/Declared Value	Measured Value
Temperature of Freezer Compartment(F2)		
Temperature Control/thermostat Setting		
Pull down time (Minutes)		

(iii) **The gross and storage volume test report (to be submitted for each of 3 unit tested):**

Gross Volume (in Litre)		
Declared value	Measured value	Observation

Storage Volume (in Litre)		
Declared value	Measured value	Observation