

Schedule – 3

Room Air Conditioners

1. Scope

1.1 This Standard specifies the energy labeling requirements for single-phase split and unitary air conditioners of the vapour compression type for household use up to a rated cooling capacity of **11 kW** and that fall within the scope of IS1391 Part 1 and Part 2, being manufactured, imported, or sold in India.

1.2 This Standard shall be read in conjunction with IS1391 Part 1 and Part 2 with all amendments¹, as applicable

In particular, this scheme specifies the following:

1. Rated power (input).
2. Rated capacity (output).
3. Energy Efficiency Ratio (EER) for cooling.
4. Star rating.
5. Some of the requirements for energy label validity.
6. The performance criteria for energy labeling validity.
7. Test report format.
8. Printing requirements for air conditioner appliance energy labels.

Exclusions:

1. Air conditioners which are not included within the scope of IS 1391 Part 1 and Part 2, pending the development of a suitable test method.
2. Multi-split systems (i.e., those having more than one indoor unit with an independent control for each indoor unit)
3. Evaporative coolers or any other cooling systems that are not of the vapour compression type.

2. Schedule of tests

2.1 Method of tests

The testing code and procedure for air conditioners shall be as per IS1391 Part 1 and Part 2 with all amendments.

Exception to IS 1391 part 1 and 2: All tests, including the Energy Consumption and Capacity tests, shall be conducted in Balanced Ambient Calorimeters for the purpose of check and challenge testing.

2.2 Parameters to be tested

2.2.1 Energy Consumption

The Energy Consumption test of the air conditioner shall be conducted as per IS 1391 Part 1 and Part 2 with all amendments.

2.2.2 Cooling Capacity

¹ Including amendments made during May 2006 meeting of BIS committee on the subject.

The Capacity Rating test of the air conditioner shall be conducted as per IS 1391 Part 1 and Part 2 with all amendments.

2.3 Test Report

The results of tests shall be reported as per Annexure I – Section 4 of this Schedule.

3. Tolerance Limit

For each unit tested, the measured capacity shall be > 0.95 of the rated value

For each unit tested, the measured energy consumption shall be < 1.05 of the rated value

For each unit tested, the EER shall be > 0.95 of the tested EER

There is no tolerance for Star Rating Band, the average of products tested must be at par or better than the Label threshold

4. Rating Plan

Rating plan will be as per Annexure I – Section 2 (CALCULATIONS FOR THE ENERGY LABEL) of this schedule.

5. Sampling

The samples will be picked up by Bureau of Energy Efficiency (BEE) or its designated agency for testing as per the following sampling plan:

- a) One sample will be picked up at random from the manufacturing facility or warehouse.
- b) One sample will be picked from a retail outlet.

Three units of each type shall be picked up for each test. The tests shall be conducted on two of the three units, the third shall be kept as an alternative in case one of the units is damaged or cannot be tested properly for any other reason..

6. Qualification

Maximum Operating Conditions Test

The Maximum Operating Conditions Test shall be conducted as per IS 1391 Part 1 and Part 2 with all amendments.

7. Label Design, manner of display

The label design and manner of display will be as per Annexure I - Section 3 (LABEL DESIGN AND MANNER OF DISPLAY) of this schedule.

8. Fees

- a) Registration fee is payable on application for assignment of authority is Rs.1000/- (One thousand only).
- b) Registration fee is payable on application for renewal of authority to affix labels is Rs. 500/- (Five hundred only).
- c) Labelling fee for affixation of label on each piece of air conditioners is Rs. 30/- (Thirty only).

Annexure – I to Schedule 3

SECTION 1

DEFINITIONS

1 Definitions

For the purposes of this schedule, the definitions given in IS 1391 Part 1 and Part 2 with all amendments and those below apply. The definitions below take preference over the ones in the above mentioned standards.

1.1. Star Rating

“Star rating or star level” means the grade of energy efficiency displayed on the label of the room air conditioner based on the energy consumption standard notified under clause (a) of section 14 to denote the energy efficiency of the air conditioner. 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 (refer 2.2 of this Annexure)

1.2. Star Rating Band

The Star Rating Band is a range of energy efficiency ratio (W/W) which is arrived by calculations (refer 2.2 of this annexure), and is used for determining the number of stars displayed on the energy label.

1.3. Family of models

Family of models is the range of models of one particular brand, to which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, comparative energy consumption, and energy efficiency rating and performance characteristics. The term ‘model’ is synonymous with ‘family of models’.

1.4. Variant

A model variant is an alternative version of a model which has the same sales specification and the same model number or other form of designation as another version of the model, and offers the same performance except that it has a different PAEC and may have a different Star Rating.

1.5. Label Period

Label period is the validity period of the energy efficiency ratio under the energy consumption standard specified by the Central Government under clause (a) of section 14 and in case the end period of the energy efficiency ratio is not specified, it shall be deemed to be valid until a new energy efficiency ratio is specified by the Central Government.

SECTION 2
CALCULATIONS FOR THE ENERGY LABEL

2.1 NUMBER OF TEST AND PROCESSING OF DATA

2.1.1 Number of units required

For the purpose of determining the Energy Efficiency Ratio (EER) of a model for labeling, two separate units of the nominated model shall be tested for capacity and energy consumption

2.1.2 Number of tests per unit

Each unit shall be tested with sufficient test runs to enable a valid EER to be determined for that unit. This determination shall be documented in a test report containing the test result for all test runs used to derive EER.

2.1.3 Rounding

- Unless otherwise stated, number shall be rounded and recorded to five significant figures. The values of Capacity (kW), shall be rounded and recorded to three significant figures.
- The values of Energy Consumption (W) shall be rounded of (< 0.5 to lower whole number and ≥ 0.5 to higher whole number) to the nearest whole number.
- The values of EER (W/W) shall be rounded and recorded to two significant figures.

2.2 STAR RATING

The star level of the room air conditioners shall be determined by Energy Efficiency Ratio which, for unitary type air conditioners shall be obtained from Table 2.1 or Table 2.2, and for split type air conditioners shall be obtained from Table 2.2 or Table 2.3 for the purpose of their manufacture or import or purchase or sale, namely:-

| SL. No. | Manufacturing or Import or purchase or Sale of | Table to be used |
|----------------|---|----------------------------------|
| 1 | Unitary type air conditioners – (i) From 01-01-2012 to 31-12-2013 (ii) From 01-01-2014 to 31-12-2015 | 2.1 2.4 |
| 2 | Split type air conditioners- (i) From 01-01-2012 to 31-12-2013 (ii) From 01-01-2014 to 31-12-2015 | 2.2 2.3 |

**Table 2.1: Star level valid for unitary type air conditioners
From 01-01-2012 to 31-12-2013**

| | Energy Efficiency Ratio (Watt/Watt) | |
|---------------------|--|----------------|
| Star level | Minimum | Maximum |
| 1 Star * | 2.30 | 2.49 |
| 2 Star ** | 2.50 | 2.69 |
| 3 Star *** | 2.70 | 2.89 |
| 4 Star **** | 2.90 | 3.09 |
| 5 Star ***** | 3.10 | |

**Table 2.2: Star level valid for Split type air conditioners
(From 01-01-2012 to 31-12-2013)**

| | Energy Efficiency Ratio (Watt/Watt) | |
|---------------------|--|----------------|
| Star level | Minimum | Maximum |
| 1 Star * | 2.50 | 2.69 |
| 2 Star ** | 2.70 | 2.89 |
| 3 Star *** | 2.90 | 3.09 |
| 4 Star **** | 3.10 | 3.29 |
| 5 Star ***** | 3.30 | |

**Table 2.3: Star level valid Split type air conditioners
From 01-01-2014 to 31-12-2015**

| | Energy Efficiency Ratio (Watt/Watt) | |
|---------------------|--|----------------|
| Star level | Minimum | Maximum |
| 1 Star * | 2.70 | 2.89 |
| 2 Star ** | 2.90 | 3.09 |
| 3 Star *** | 3.10 | 3.29 |
| 4 Star **** | 3.30 | 3.49 |
| 5 Star ***** | 3.50 | |

**Table 2.4: Star level valid for unitary type air conditioners
(From 01-01-2014 to 31-12-2015)**

| | Energy Efficiency Ratio (Watt/Watt) | |
|---------------------|--|----------------|
| Star level | Minimum | Maximum |
| 1 Star * | 2.50 | 2.69 |
| 2 Star ** | 2.70 | 2.89 |
| 3 Star *** | 2.90 | 3.09 |
| 4 Star **** | 3.10 | 3.29 |
| 5 Star ***** | 3.30 | |

The above equation provides for the value of the various Star Rating Bands for a particular model. The Star Rating chosen for the model will be based on the lower and the upper limits of each Star Rating Band.

There is **no tolerance** for the Star Rating Bands. All tested products must meet the minimum threshold for each Star Rating Band. The scope for manufacturing tolerance and other variations shall be accounted for when determining the Star Rating.

SECTION 3

LABEL DESIGN AND MANNER OF DISPLAY

3.1 PLACEMENT

All air conditioners must display the label at the point of sale. The label shall be adhered, or attached as a swing tag, on the front of the unit or display front.

For units not on display, the label may be attached to the exterior of the packaging and the label may be attached to the unit when the unit is removed from its packaging or the label may be included as a part of the documentation given to the customer/user.

3.2 MATERIAL AND SHAPE

The label shall be of durable cardboard, if it is to be attached as a swing tag, or be self-adhesive and shall be cut to one of the outlines shown in dimension design scheme for the label (**Figure 3.1**).

3.3 COLOURS

The label shall be printed as per the specification given in **Figure 3.2**.

3.4 SAMPLE LABEL

An example of a printed energy label for air conditioner is shown in **Figure 3.3**.

The label will mention the following:

1. Appliance/Type:
2. Brand/Model Name/Number/Year of Manufacturing
3. Capacity (kW) (Actual Tested)
4. Power (Watts)
5. EER (W/W)
6. Label Period
7. Variable Output Compressor (Yes/No)
8. Heat Pump (Yes/No)

**Details of particulars to be displayed on labels of Window type Air Conditioners
(Applicable up to 31st December 2013)**

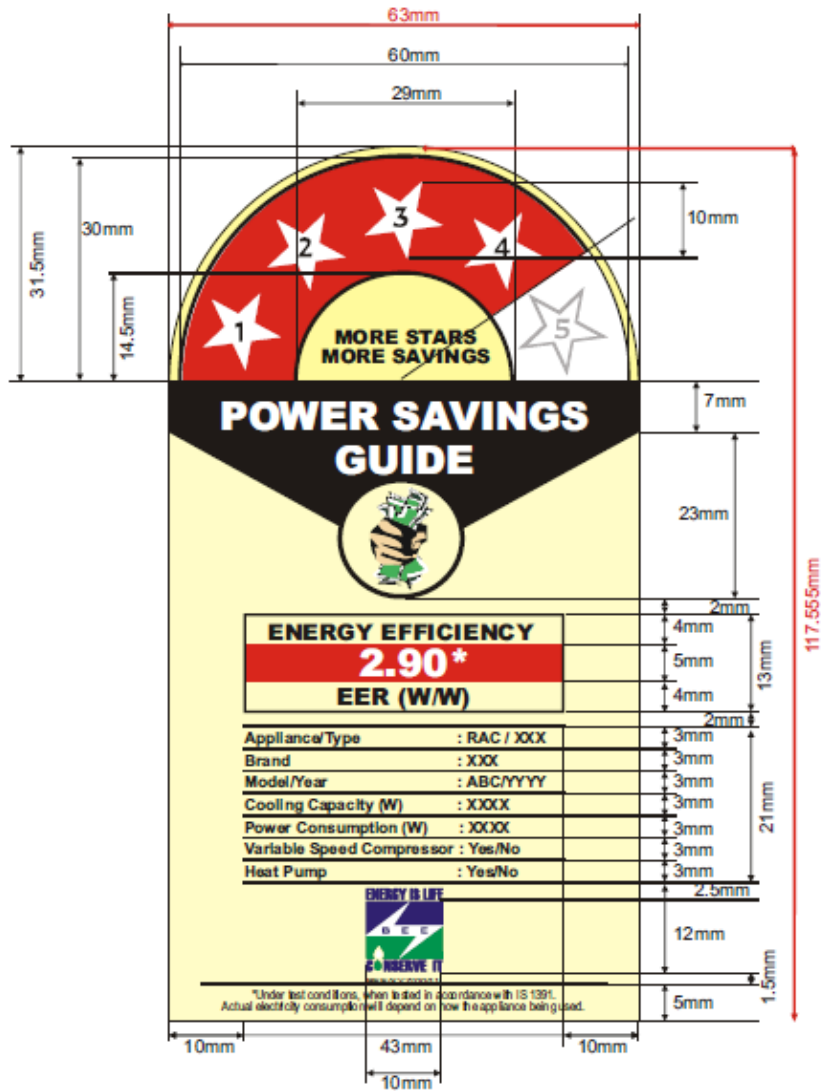


Figure 3.1: Design Scheme for the Label (Sample).

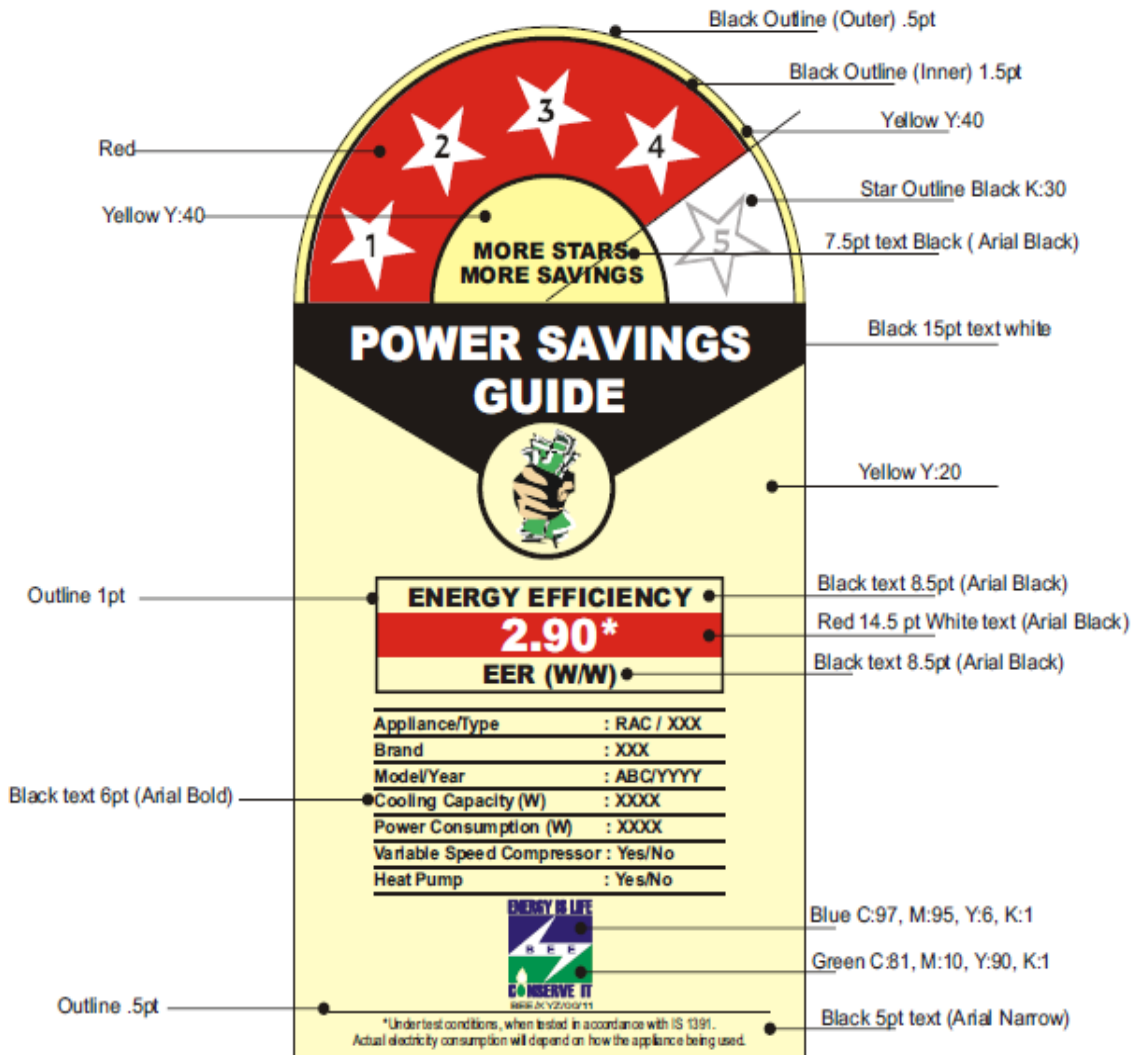


Figure 3.2: Colour Scheme for the Label (Sample).

The following colour scheme for Bureau’s logo, namely:-

BLUE –

Hue (H)-239° Saturation(S):64% Brightness (B):59%
 Luminance or lightness (L):28, chromatic components -a:24 b:54
 Red(R):54 Green (G):55 Blue (B):151
 Cyan(C):97% Magenta (M):95% Yellow(Y):6% Black (K):1%
 Web colour code - #363797

GREEN –

Hue (H)-150° Saturation(S):10% Brightness (B):67%
 Luminance or lightness (L):61, chromatic components -a:53 b:32
 Red(R):0 Green (G):170 Blue (B):87
 Cyan(C):81% Magenta (M):10% Yellow(Y):90% Black (K):1%
 Web colour code - #00AA56;

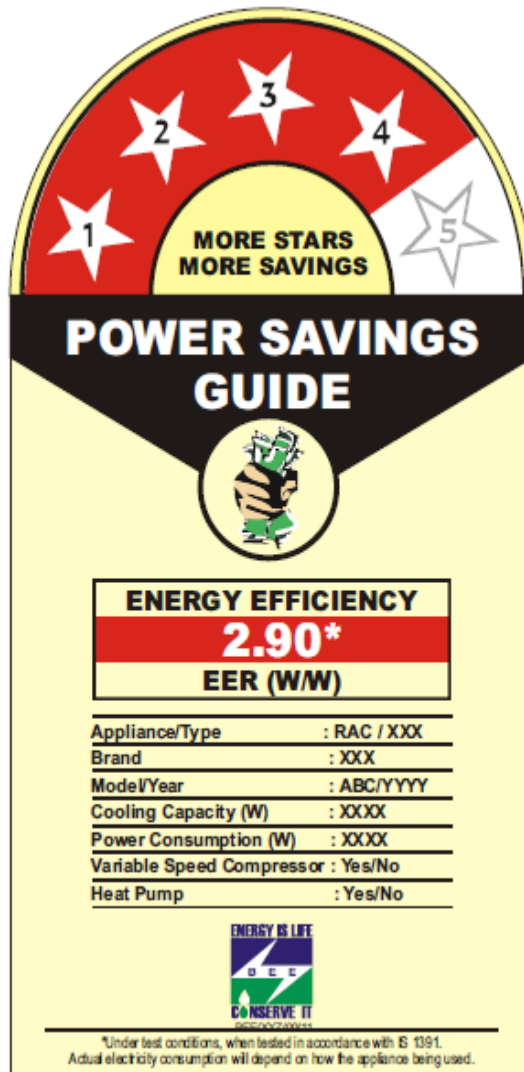


Figure 3.3: Sample Label

Details of particulars to be displayed on labels of Split type Air Conditioners.

(Also applicable for Window type Air conditioners after 01st January, 2014)

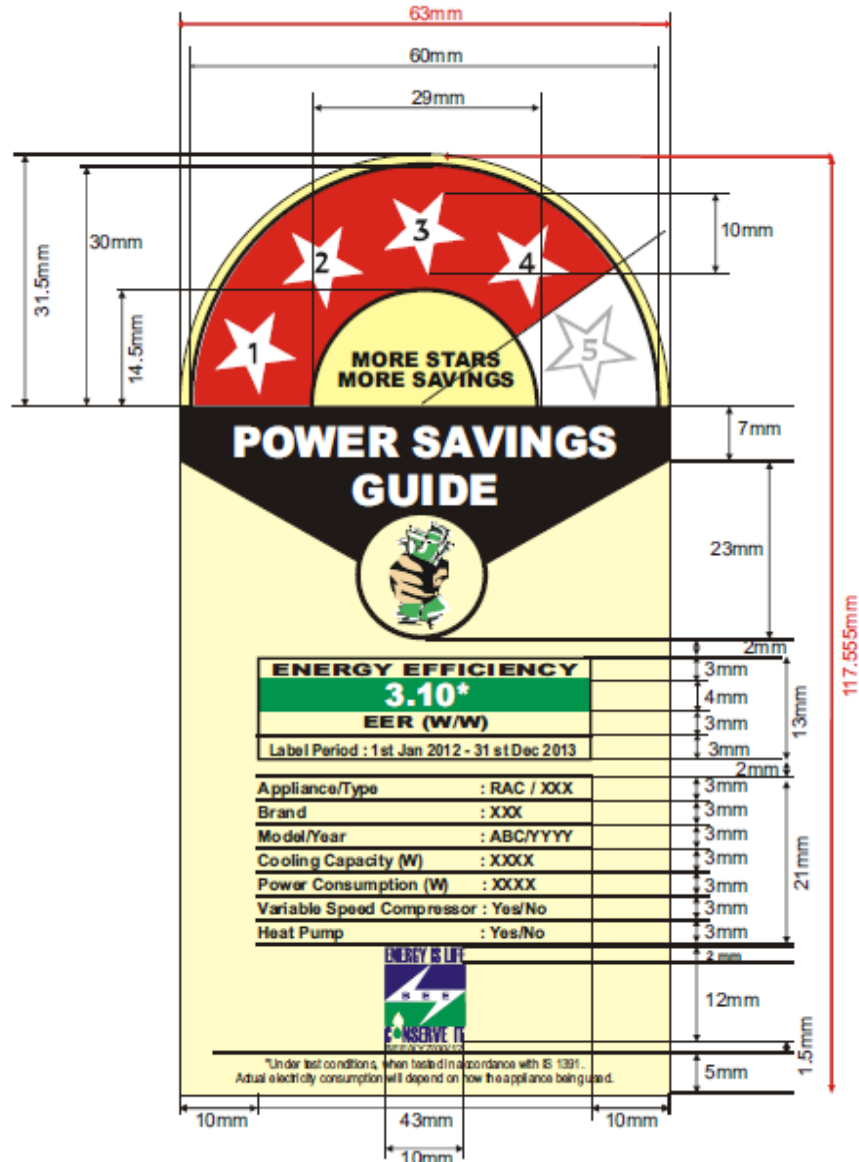


Figure 3.1: Design Scheme for the Label (Sample).

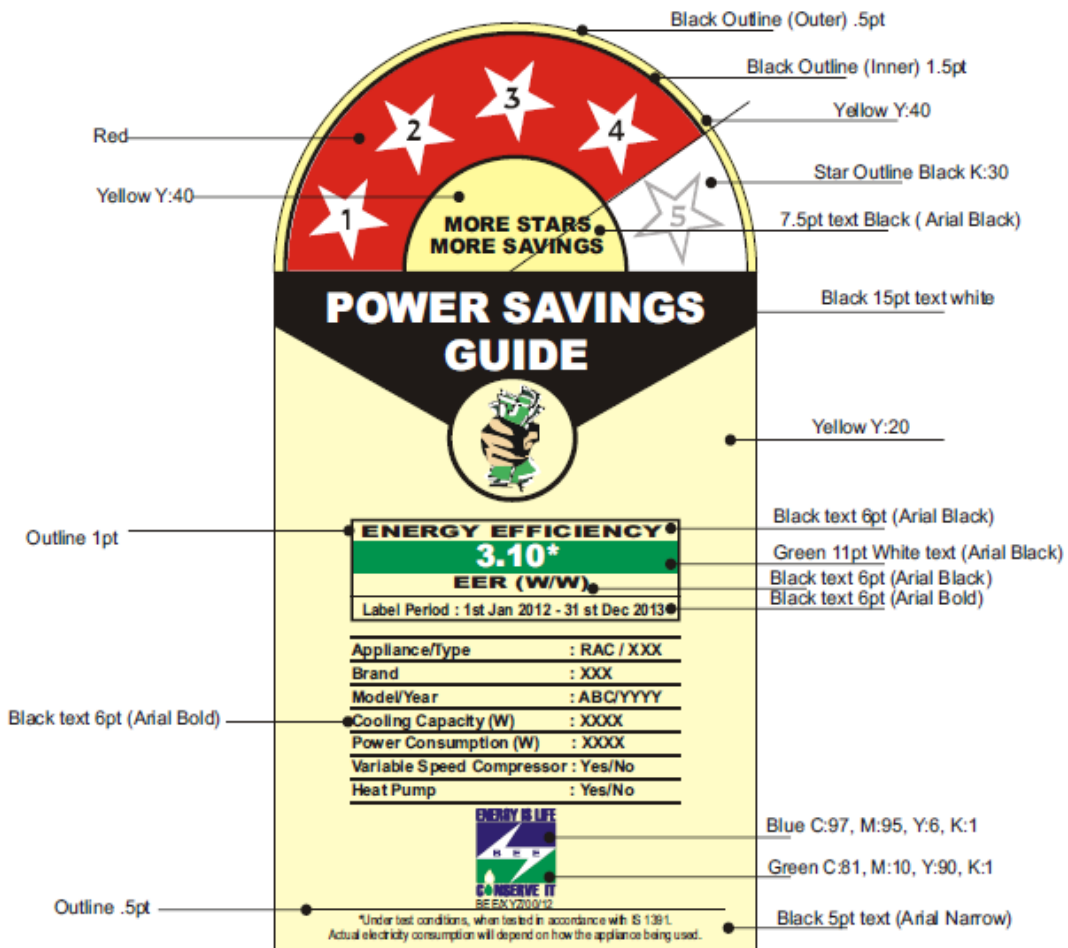


Figure 3.2: Colour Scheme for the Label (Sample).

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

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

BLUE –

Hue (H)-239° Saturation(S):64% Brightness (B):59%
 Luminance or lightness (L):28, chromatic components -a:24 b:54
 Red(R):54 Green (G):55 Blue (B):151
 Cyan(C):97% Magenta (M):95% Yellow(Y):6% Black (K):1%
 Web colour code - #363797

GREEN –

Hue (H)-150° Saturation(S):10% Brightness (B):67%
 Luminance or lightness (L):61, chromatic components -a:-53 b:32
 Red(R):0 Green (G):170 Blue (B):87
 Cyan(C):81% Magenta (M):10% Yellow(Y):90% Black (K):1%
 Web colour code - #00AA56;

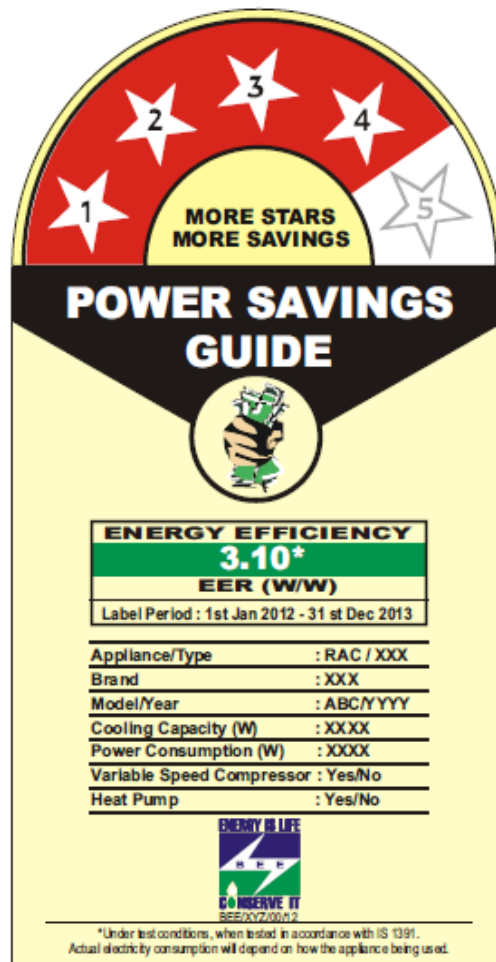


Figure 3.3: Sample Label

SECTION 4
FORMAT OF TEST RESULTS

NOTE: A separate form should be prepared for each unit tested.

Airconditioner details

Brand:

Model name: (if applicable)

Model number: (of package unit or indoor unit if split system)

Model number: (of outdoor unit if split system)

A/C Configuration 1—Air distribution Ducted/non-ducted

A/C Configuration 2—Type Cooling only/heating only/cooling and heating

A/C Configuration 3—Heat transfer Air/cooling tower/water loop

Non-ducted split system indoor unit mounting: Wall-hung/Under ceiling/Floor mounted/Cassette/Floor/Ceiling

Serial number(s) of unit tested: (of package unit or indoor unit if split system)

Serial number(s) of unit tested: (of outdoor unit if split system)

Rated voltage: V (of package unit or indoor unit if split system)

Rated voltage: V (of outdoor unit if split system)

Rated frequency:

Rated cooling capacity:

Rated effective power input, cooling:

Rated heating capacity (where applicable):

Rated effective power input, heating (where applicable):

Does this air conditioner use a variable output compressor (e.g., speed drive or multi-speed compressor)?

Test summary

Complete a separate copy of this page for each test type, as applicable

Date of test:

Test officer:

Test mode: Cooling only

Test type: Cooling capacity/ /maximum cooling/all applicable tests

Nominal test condition:.,

Test room type indoor equipment: Calorimeter/Enthalpy test room

Test room type outdoor equipment: Calorimeter/Enthalpy test room/Water loop

Test Standard:

Test mode: Cooling/heating/maximum cooling

Supply voltage: V (of package unit or indoor unit if split system)

Supply voltage: V (of outdoor unit if split system)

Supply frequency: Hz

Average current (amps): (Single-phase)

Stabilization period (minutes):

Test period (minutes):

Indoor condition — mean dry bulb (°C):

Indoor condition — maximum variation dry bulb (max – min) (°C):

Indoor condition — mean wet bulb (°C): (where applicable)

Indoor condition — maximum variation wet bulb (max – min) (°C): (where applicable)

Fan setting:

Average air flow volume (m/hour):

Indoor external static pressure (Pa): (ducted units only)

Outdoor condition — mean dry bulb (°C):

Outdoor condition — maximum variation dry bulb (max – min) (°C):

Outdoor condition — mean wet bulb (°C):

Outdoor condition — maximum variation wet bulb (max – min) (°C):

Reading frequency (minutes):

Cooling capacity results

Measured sensible cooling capacity (W):

Measured latent cooling capacity (W):

Measured total cooling capacity (W):

Measured effective power input (W):

Measured EER cooling (W/W):

Maximum Operating Conditions Test results

Did the unit pass the Maximum Operating Test? Yes/No