Electric Appliance Energy Labeling Guideline

Energy Label Requirements for Air Conditioners

	Sustainable and Renewable Energy Development Authority (SREDA) 9,10th floor, IEB Building, Ramna, Dhaka Ministry of Power, Energy and Mineral Resources	

Constitution of Technical Committee for Labeling Program

No	Name Designation organization	Committee
01	Member, SREDA	Chairman
02	Minimum 3 person from technical institution	Member
03	Representative from BSTI	Member
04	Representative from BAB	Member
05	Representative from Consumer association	Member
06	Representative from SME foundation	Member
07	Representative from Related business association	Member
08	Representative from Ministry of Power, Energy and Mineral Resources	Member
09	Representative from Ministry of Commerce	Member
10	Representative from Ministry of Industry	Member
11	Representative from concern officials of SREDA	Member-Secretary

Foreword

0.1 This Guideline was prepared by Sustainable and Renewable Energy Development Authority after, thoroughly discussed and finalized by the Technical Committee for Labeling Program.

0.2 The Guideline is subject to periodical reviews and amendments in order to keep pace with the latest industrial and technological development. Any suggestion for improvement will be recorded and placed to revising the guideline by the Committee when the need may arise.

0.3 In the preparation of this guideline assistance has been drawn from relevant Minimum Energy Performance Standard (MEPS) BDS 1852:2012 set by BSTI and assistance so derived is acknowledged here with thanks.

APPENDICES

A EXAMPLES OF ENERGY EFFICIENCY CALCULATIONS

B FORMAT OF APPLICATION FOR REGISTRATION OF AN AIR CONDITIONER FOR ENERGY LABELLING AND MEP

Electrical Appliance Energy Labeling Requirements

1.1 Scope

This guideline specifies the energy labeling requirements for single-phase non-ducted air conditioners of the vapor compression type up to a rated total cooling capacity.

Particular regulatory requirements for different categories of air conditioning equipment and validity dates are summarized in appendix E of this Standard.

This guideline does not specify electrical safety requirements, performance requirements, Minimum Energy Performance Standard (MEPS) and Testing requirement of MEPS.

This guideline specifies the following value for cooling and heating, as applicable:

a) Rated power (input).
b) Rated capacity (output).
c) Energy efficiency ratio (EER) for cooling.
d) Coefficient of performance (COP) for heating.
e) Annual energy efficiency ratio (AEER) for cooling.
f) Annual coefficient of performance (ACOP) for heating.
g) Star rating index (SRI).
h) Star rating.
i) Some of the requirements for energy label validity.
j) The performance criteria for energy label validity.
l) Printing requirements for air conditioner appliance energy label.

1.2 Exclusion

The following equipment is excluded from the scope of this standard.

a) Close controlled air conditioners and chillers.
b) Multi split system (i.e., those having more than one indoor unit with an independent control for each indoor unit)
c) Evaporative coolers or any other cooling systems that are not of the vapor compression type.
d) Unbalanced air conditioners and spot coolers (these include some portable types).
e) Single Phase models that are designed for commercial applications, and where the requirements of (i), (ii) and (iii) below are met, are not required to display an Energy Rating label but are still required to be licensed.
    I. designed for and used only in non-residential applications; and
    II. not on display for sale through retail outlets; and

III. not promoted in any catalogue or advertising material that could be interpreted as suitable for some residential applications.

f) Air conditioners powered by mains electricity specifically designed and sold only for installation in end-use mobile applications of caravans, mobile homes, camper vans and rail cars.

g) Models that have been granted exemption by Sustainable and Renewable Energy Development Authority (SREDA) & Bangladesh Standards and Testing Institution the only regulatory authority of Bangladesh due to their specific design for application such as process cooling, or for cooling of spaces to conditions that are not intended for human comfort.

1.3 Objective

The objective of this Guideline is to —

(a) Provide detailed information on the energy labelling requirements that an air Conditioning appliance has to meet in order to carry a valid energy efficiency label;

1.4 Reference

The BDS 1852:2012 set by BSTI is referred to in this Guideline.

1.5 Definitions

For the purposes of this Standard the definitions given in below shall apply

1.5.1 Annual Coefficient of Performance (ACOP)

Annual Coefficient of Performance as defined in accordance with Clause 2.5

1.5.2 Annual Energy Efficiency Ratio (AEER)

Annual Energy Efficiency Ratio as defined in accordance with Clause 2.5

1.5.3 Average True Power Factor

The average true power factor over a given time is the kWh divided by the k V Ah.

NOTE: It is not the average of regular instantaneous power factor measurements.

1.5.4 Check Test

A full or part test in accordance with this guideline or a simulation assessment as applicable, to verify the performance or energy consumption, or both, of an individual model.

1.5.5 Chiller

A product that falls within the scope of this guideline.

1.5.6 Close Control Air Conditioners

A product that falls within the scope of this guideline.

1.5.7 Demand Response Capable

An air conditioner that is supplied with the necessary interface, circuitry and components.

NOTE: Air conditioners that are assembled from components on site are Demand Response Capable. If all components necessary to make the assembly Demand Response Capable are supplied with every unit, and the installation instructions require all components be assembled.

1.5.8 Ducted Air Conditioners

An air conditioner model configuration where the indoor side is situated remote to the space to be conditioned. The conditioned air is supplied or extracted via a duct.

1.5.9 Family of Models

A range of models of the one brand, for which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, energy efficiency rating, performance characteristics and refrigerant. The term 'model' is synonymous with 'family of models'.

NOTE: A product that has single-phase and three-phase variants will have to be separately registered and cannot be considered as one family (as MEPS requirements for single- and three-phase variants may be different). Single- and three-phase products may be separately registered using a single test report that covers these variants, as long as the product tested has the lowest EER and COP of all the relevant variants.

1.5.10 Multi-Split System

A split system air conditioner with a refrigeration system having two or more indoor units, each indoor unit being independently controlled.

1.5.11 Non-Ducted Air Conditioner

An air conditioner model configuration where the indoor side is situated partly or wholly within the space to be conditioned. The conditioned air is directly supplied to and extracted from the conditioned space.

1.5.12 Rated Capacity

The nominal rated capacity claimed by the manufacturer of an air conditioner model as follows, as applicable:

a. Rated total cooling capacity: As claimed by the manufacturer in accordance with BDS 1852:2012 standard for temperature condition T1. (Units: W or kW.)
b. Rated heating capacity: As claimed by the manufacturer in accordance with BDS 1852:2012 standard for temperature condition H1. (Units: W or kW.)

The rated capacity shall be stated on the product, in the product specification or the associated product literature.

The rated capacity appears on the energy label as 'Capacity Output' (heating and/or cooling as applicable. (Units: kW).

For variable output capacity equipment, the rated capacity of each model shall not exceed the maximum continuous output rating possible by the unit. Short term peak outputs shall not be used for rated capacity.

The rated capacity for variable capacity systems is set using the specified method described in the model certification.

1.5.13 Rated Power

Effective power input of the air conditioner model as claimed by the manufacturer in accordance with BDS 1852:2012 standard during the determination of rated total cooling capacity and rated heating capacity, as applicable. (Units: W or kW.)

1.5.14 Single-Phase Model

A model where all components in the air conditioning system that require an external power supply require only single-phase power.

NOTE: Some components of an air conditioner system may be supplied a.c. or d.c. power via internal wiring.

1.5.15 Split System

An air conditioner with separate indoor and outdoor components that are connected with refrigerant piping. The indoor unit usually lies within the conditioned space and may be installed or portable/mobile.

NOTE: The indoor unit in some configurations may feed into a duct system. Some split ducted system indoor units may have no fan and are designed to operate with an existing system (e.g., gas heater).

1.5.16 Spot Cooler

A unitary air conditioner that lies wholly within a conditioned space and that draws air for both the evaporator and condenser from the conditioned space and expels both of these back into the conditioned space.

1.5.17 Standby

A non-operative state where the user has switched the air conditioner so that it is not providing any active heating and/or cooling and/or air circulation from the user's perspective. A number of different standby modes may exist within an individual product. The power level in standby may be affected by ambient conditions and other factors such as the time since the refrigeration

system last ran. Standby includes all power consumed by controls (including demand response) and any heaters or other power consumed.

NOTE: Refer to clause 2.4 for power consumption in non-operative mode.

1.5.18 Star Rating

The number of stars displayed on the energy label. Available stars are between a minimum of one and a maximum of six, shown in half star intervals and then 7 to 10 stars in whole star intervals. The star rating is calculated from the Star Rating Index (see Clause 2.6) (Dimensionless).

1.5.19 Star Rating Index (SRI)

An indication of the claimed energy efficiency of a model at rated conditions. A higher SRI indicates a higher energy efficiency. It is derived from the measured AEER or measured ACOP, as applicable (see Clause 2.5).

1.5.20 Statements of Intention

1.5.20.1 Shall

Indicates that a statement is mandatory.

1.5.20.2 Should

Indicates a recommendation.

1.5.21 Tested Value

Value determined in accordance with a physical test of the Relevent BDS standard.

1.5.22 Three-Phase Model

A model where at least one component in the air conditioning system requires an external three-phase power supply.

1.5.23 Twin (or Triple) Split

A split system air conditioner comprising a single outdoor unit with two (or three) indoor units that are controlled by a single controller.

1.5.24 Unbalanced Air Conditioner

An unbalanced air conditioner is a unitary air conditioner that lies wholly within a conditioned space and that draws air from the conditioned space and expels this to outdoors. An unbalanced air conditioner is usually ducted (where the exhaust air from the heat exchanger is expelled from the conditioned space via a flexible ducts, pipe or opening) but may be connected to a pipe or other opening such as a window. These units are typically portable or mobile.

1.5.25 Unitary Air Conditioner

An air conditioner where the evaporator, condenser and associated refrigeration components (e.g., compressor) are contained within a single casing. Unitary air conditioners may be non-ducted (e.g., window/wall units) or ducted (e.g., single packaged units).

1.6 Measured Quantities

Quantities used in this Standard shall be measured during tests carried out in accordance with this standard.

1.7 Rounding

Unless otherwise stated, numbers shall be rounded and recorded to five significant figures in accordance with relevant BDS.

1.8 Claims of Capacity and Energy Consumption

1.8.1 Qualifications to claims

Any unqualified claims of capacity and energy consumption shall be rated values for condition T1 or H1 or H2, as applicable (see Clauses 1.5.13 and 1.5.14). Other claims of capacity and energy consumption shall be qualified by the conditions under which these values are determined.

1.8.2 Prohibition on the Use of the Term 'Horse Power'

The use of 'horsepower' as a unit of measure for air conditioner output capacity shall not be used in advertising material or product literature because it does not directly correlate to the output capacity in kW and is therefore misleading.

Section 2 Calculations for the Energy Label

2.1 Scope of Section

This section sets out the equations and procedures for calculating the power input, SRI values and the star rating, which appear on an energy label. This section applies to all single- phase non-ducted appliances that fall within the scope of guideline and to three-phase appliances and ducted single-phase appliances that the supplier eagers to get approval for energy labelling.

Suppliers are not permitted to claim a star rating in product literature or advertising material unless the product has a valid approval for energy labelling in accordance with this Section.

2.2 General

Energy labels may not be fixed to appliances that do not comply with the requirements of this section. Energy labels are provided for cooling only units, heating only units and heating and cooling units. Units that have the capability to both heat and cool shall be labelled as a heating and cooling unit.

> NOTE: Air conditioners where heating is provided only by means of resistive heating may not meet the MEPS requirements for heating performance specified in this guideline.

The capacity and energy values shown on the energy label are based on the rated capacity and the rated power, as claimed by the manufacturer. The values on the energy label shall be consistent with the capacity on the model`s rating nameplate or all other data in any associated product literature (or both) for the specified conditions. The Star Rating Index of the air conditioner shall be based on the AEER, and the ACOP, as applicable, for the unit(s) tested.

> NOTE: Manufacturers are also permitted to indicate the heating output for condition H2 on the energy label under certain conditions. Refer to the relevant requirements in BDS 1852:2012.

The results of the unit(s) tested are used to assess the validity of the rated capacity and the rated power. The determination of tested capacity (cooling and heating) and tested total power input for the unit(s) used for the purposes of energy labelling shall be conducted using the calorimeter test method as specified in BDS 1852:2012 for condition T1 for cooling or condition H1 for heating, as applicable. Determinations using the indoor air- enthalpy/ psychrometric test method of these Standards or determinations using the simulation method specified in BDS 1852:2012 is not acceptable for energy labelling.

2.3 Number of Tests and Processing of Data

2.3.1 Number of Units Required

For the purposes of verification of the rated values of a model, at least one unit of the nominated model shall be tested for capacity, effective power input and EER for condition T1 for cooling and/or, where applicable, capacity, effective power input and COP for condition H1 for heating in accordance with this standard. At the supplier's discretion more than one unit may be tested.

2.3.2 Number of tests per unit

Only one valid test from each unit tested shall be considered when determining the energy label data in accordance with this standard.

2.3.3 Verification of rated values

As a prerequisite to the determination of values for an energy label, the unit(s) tested shall each comply with the following validity criteria for cooling and heating, as applicable:

(a) Tested effective power input for each unit ≤1.05 X rated power.
(b) Tested cooling and heating capacity for each unit ≥0.95 X rated capacity.

For verification tests, the unit shall be operated at rated capacity at condition T1, H1 and/or H2 (as applicable) in accordance with BDS1852:2012 for the determination of measured cooling or heating capacity, effective power input, energy efficiency ratio and/or coefficient of performance and compliance with applicable MEPS requirements. The unit under test shall be installed and tested as specified in Clause 2.2 and shall be operated in accordance with the settings for rated capacity using the method described in the model registration.

2.4 Power Consumption in Non-Operative Mode

The non-operating power of an air conditioner is the average power consumption of the air conditioner when not providing a cooling or air circulation function for the user as determined in accordance with BDS 1852:2012.

2.5 Annual Efficiency

The AEER of an air conditioner is defined as follows:

$$AEER = \frac{[Tested\ Cooling\ Output\ \times 2000]}{[Tested\ Cooling\ Effective\ power\ input\ \times 2000] + [P_{noc} \times 6.76]} \ldots\ldots\ldots 2.5a$$

Where,

Tested cooling output-is the measured value in kW.
Tested cooling effective power input is the measured value in kW.
2000 is a factor that is the assumed hours of operation per year in cooling mode.
P_{noc} is the non-operating power in watts in cooling mode as defined in Clause 2.4.

6.7 is a factor that converts power (watts) to energy (kWh) for (8760 - 2000) h per year

The ACOP of an air conditioner is defined as follows:

$$ACOP = \frac{[Tested\ Heating\ Output\ \times 2000]}{[Tested\ Heating\ Effective\ power\ input\ \times 2000] + [P_{noh} \times 6.76]} \ldots\ldots..2.5b$$

Where,

Tested heating output is the measured value in kW.
Tested heating effective power input is the measured value in kW.
2000 is a factor that is the assumed hours of operation per year in heating mode
P_{noh} is the non- operating power in Watts in heating mode as defined in Clause 2.4.
6.76 is a factor that converts power (watts) to energy (kWh) for (8760 – 2000) h per year.

2.6 Star Rating Index (SRI)

2.6.1 General

The SRI for a model of air conditioner for cooling and heating, as applicable, shall be determined in accordance with Clauses 2.6.2 and 2.6.3 respectively/using the (AEER) and (ACOP) for the unit(s) as defined in Clause 2.5. The value for AEER and ACOP shall be in watts/watt.

NOTE: The equations for SRI in the following clauses were derived from a market analysis in 2021.

2.6.2 SRI Cooling

The SRI for cooling is calculated by the following equation:

$$SRI\ Cooling = \frac{[(AEER \times 8) - 18]}{4} \ldots\ldots..2.6(1)$$

2.6.3 SRI Heating

$$SRI\ Heating = \frac{[(ACOP \times 8) - 18]}{4} \ldots\ldots..2.6(1)$$

2.7 Star Rating

The star rating is based on the SRI and is obtained from Table 2.1.

Table 2.1 Derivation of Star Rating

Star Rating Index (SRI)	Star rating	Symbolic Star	Comment
SRI<1.5	1.0	★	
1.5 ≤ SRI < 2.0	1.5	★½	
2.0 ≤ SRI < 2.5	2.0	★★	
2.5≤ SRI< 3.0	2.5	★★½	
3.0 ≤ SRI < 3.5	3.0	★★★	
3.5 ≤ SR1< 4.0	3.5	★★★½	
4.0 ≤ SRI < 4.5	4.0	★★★★	
4.5 ≤ SRI < 5.0	4.5	★★★★½	
5.0 ≤ SRI < 5.5	5.0	★★★★★	
5.5 ≤ SR1 <6.0	5.5	★★★★★½	
6.0 ≤ SRI < 7.0	6.0	★★★★★★	Efficient
7.0 ≤ SRI < 8.0	7.0	★★★★★★ ★	Super Efficient
8.0 ≤ SRT < 9.0	8.0	★★★★★★ ★★	Super Efficient
9.0 ≤ SRI < 10.0	9.0	★★★★★★ ★★★	Super Efficient
10.0≤ SRI	10.0	★★★★★★ ★★★★	Super Efficient

2.8 Examples of Energy Efficiency Calculations

For a complete example of calculations carried out on a typical set of test results refer to Appendix A.

2.9 Energy Label Validity (Check Testing)

The energy label shall be accepted as valid when a single sample of a model, tested for an initial screening test, meets the following criteria for cooling and heating, as applicable:

(a) Tested effective power, input ≤ 1.10 x rated power.

(b) Tested cooling and heating capacity ≥0.90 x rated capacity.

(c) Tested EER ≥0.90 x rated EER.

(d) Tested COP ≥0.90 x rated COP.

(e) Tested AEER ≥0.90 x rated AEER.

(f) Tested ACOP ≥0.90 x rated ACOP.

If the above criteria do not apply, the label shall be accepted as valid if up to three additional units are tested and the average values for these additional units are as follows:

(i) Tested average effective power input ≤1.10 x rated power.

(ii) Tested average cooling and healing capacity ≥ 0.90 x rated capacity.

(iii) Tested average EER ≥0.90 x rated EER.

(iv) Tested average COP ≥0.90 x rated COP.

(v) Tested AEER ≥0.90 x rated AEER.

(vi) Tested ACOP ≥0.90 x rated ACOP.

The values in this clause shall not to be applied as a tolerance on the original test measurements that are used to support an application for label license. The tolerances above are only an allowance for possible variation in test results for test sample due to production variability, sampling error and all measurement uncertainties in or between laboratories, which is applied when assessing a check test result.

NOTE: The administrative guidelines set out important information and the methodology used by Government for check testing of a product licensed to BDS 1852:2012 . These guidelines can be found on www.bstibds.com Note that different criteria are applied to the verification of MEPS compliance.

Check testing will be undertaken using the conditions (e.g. settings, duct pressure and air flow rates) specified in the application for registration for energy labeling (where applicable).

2.10 Maximum Cooling Test

Appliances that are licensed for energy labelling shall meet the requirements of the maximum cooling test set out in the relevant standards as applicable, when tested to temperature condition T1 as specified for the maximum cooling test. This test may be conducted using either a calorimeter or the indoor air-enthalpy/psychrometric test method.

While all units within a model are required to meet the maximum cooling tests requirements of the relevant standards only one unit need be tested to confirm this for the purposes of energy labelling. Evidence of such a test report shall be provided in license.

Where circumvention is suspected during a check test, including in non-operative mode, a laboratory shall subject the appliance to various measures in an attempt to detect such devices. Details of any such action and their effect shall be included in the test report.

Section 3 Applications and Test Result Formats

3.1 Label License in Bangladesh

3.1.1 General

Where the relevant regulatory authority requires license or approval of energy labels requirements, clauses 3.1.2 and 3.1.6 shall apply.

3.1.2 License

For an energy labelling application in accordance with Appendix B, a test report to the relevant standards or a summary report, shall be provided for the relevant test points.

Where a supplier wishes to indicate the heating capacity on the energy label at 2°C in accordance with Section 4, this shall be indicated in the energy labelling application in Appendix B. To support the claimed heating capacity output and to verify the performance requirements in Clause 2.4-2.5 where applicable, a test report to the relevant standards or a summary report shall be provided for condition H2.

NOTES:

1. Applications in the form of computer printouts, which present all the application data in a similar layout to the forms in Appendix B, are valid.

2. See Appendix C for a summary report.

3.1.3 Test Report

A test report in accordance with this standard for each model tested shall be held by the appliance supplier. Documentation on the determination of non-operative power shall also held by the appliance supplier.

The documents required by this section shall be made available to the relevant regulatory authority upon request. Records shall be retained for at least five years after the last date of manufacture or import, whichever is applicable.

3.1.4 Energy Label Transitions

Regulators have advised that products with existing license for energy labelling to a previous edition of this standard can continue to affix and display these previously approved labels until the product requires re-registration for energy labelling as defined in this guideline.

3.1.5 Duration of License

License for energy labelling shall have a validity of up to 3 years.

3.1.6 Test Report Requirements

A test report prepared in accordance with this standard for each model of air conditioning appliance shall be held by the manufacturer or importer and made available to the regulatory authority upon request. The license applicants may also choose to upload the test reports when completing and submitting the prescribed form.

3.1.7 Date of Manufacture Information

The date of manufacture may be non-encrypted, encrypted or able to be determined from a serial number or other markings on the appliance and shall be visible when the appliance

is in its position of normal use. Information on how to determine the date of manufacture shall be provided on the license form (see Appendix B).

NOTES:

(a) Regulators will use the date of manufacture as a guide as to when a product may have been available for sale. It is therefore preferable to be able to determine at least the month and year of manufacture from information on the appliance. This does not however preclude the use of other markings, for example serial numbers, which indicate those appliances manufactured within a period of time, with such details given on the license form.

(b) Irrespective of the information marked on the appliance, local manufacturers or importers may be required to provide evidence of the actual manufactured or imported date if requested by a regulator.

Section 4 Printing and Placement of Energy Labels

4.1 Placement

The label shall be adhered, or attached as a swing tag (either a double-sided swing tag or a single-sided, non-rotating swing tag), on the front of the unit or display front. The label may be attached to the exterior of the packaging. The label shall be attached to the unit when the unit is removed from its packaging for display purposes. All labels, including those on swing tags, shall be suitably affixed to the product to ensure that they remain in place and visible while on display at the point of sale.

> NOTE: Where labels are removed from products that are on display at the point of sale, the retailer may be subject to fines under energy labelling regulations.

4.2 Material and Shape

The label shall be of durable material, 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 Figures 4.2, 4.3 or 4.4, as applicable. A trim or die cut margin of up to 2 mm around the label is acceptable. The die cut across the top of the label can be a semi-circle (following the star arch) or a square cut at the top of the star arch.

4.3 Colors

4.3.1 Cooling Only Label

The cooling only label shall be of a white background, and shall be printed in the following colures (see Figure 4.2):

(a) Pantone 300 (Blue).
(b) Pantone Black.
(c) Pantone 116 (Yellow).

4.3.2 Heating and Cooling Label

The heating and cooling label shall be of a white background, and shall be printed in the following colures (see Figure 5.3):

(a) Pantone 300 (Blue)
(b) Pantone Black.
(c) Pantone Warm Red.
(d) Pantone 116 (Yellow).

4.3.3 Heating Only Label

The heating only label shall be of a white background, and shall be printed in the following colures (see Figure 5.4):

(a) Pantone Warm Red.
(b) Pantone Black.
(c) Pantone 116 (Yellow).

4.4 Label Varients

The following label variants are permitted under the circumstances specified:

(a) Where a product achieves a star rating from 1 to 6 stars for heating and cooling—
  i. base label (with the relevant star rating and energy consumption) (refer to Figure Dl); or

ii. base label plus the transition wording in a white box at the base of the label for products manufactured or imported before 1 October 2010 (refer D4 and D5); or
iii. base label plus an empty white box at the base of the label for an indefinite period.

(b) Where a product achieves a star rating from 7 to stars for heating cooling−
i. base label showing 6 stars and relevant energy consumption; or
ii. the super efficient label showing 6 stars in the lower arch and relevant energy consumption in the lower part the earned stars (7, 8, 9 or 10) in the upper arch for heating or cooling, as applicable.

Sample labels are shown in Figures 4.2, 4.3, 4.4, 4.5 and 4.6 Details of dimensions, fonts and geometry for all label elements are provided in Appendix D.

As an alternative to the reverse cycle label shown in Figures 4.1, 4.3, 4.5 and 4.6, for reverse cycle products suppliers may elect to supply both a cooling only label (Figure 4.2) and a heating only label (Figure 4.4) that both must be affixed to the product in accordance with Clause 4.1. These labels may be placed in any arrangement where the labels are adjacent.

4.5 Label Requirements

The font shall be Gill Sans, Humanist 521 or Hammersmith. The preferred font is Gill Sans as illustrated in the Figures. Only one font shall be used on a label. The fields (a), (b), (c) and (d) of Figure 4.1 shall comply with the following requirements:

(a) Field a This band shall terminate according to the appliance's star rating for heating and/or cooling (as applicable), either bisecting the relevant star for a rating of half a star or, for a rating of only full stars, bisecting the gap between the relevant star and the next highest on the scale. Only whole stars are shown from 7 to 10 stars (refer to Figures D3 (a) and (b).
(b) Field b This panel shall contain the rated total cooling capacity and rated heating capacity, as applicable (capacity output). The Figures that apply to the particular appliance shall be of the font and size indicated and shall be centered in the blue panel for cooling and the red panel for heating. The spacing between the figures of a three - digit number is the same as for a four-figure number. Where a product complies with MEPS requirement as per BDS1852:2012, the heating capacity at 2°C may be included as shown.
(c) Field c The brand and the model shall be inserted here. The wording should be complete and concise. The lines shall not exceed a measure of 65 mm. They should have normal spacing of letter, line and word and they shall be centered horizontally in the area allowed. In the case of split systems, where the indoor and outdoor components have different model numbers, model numbers for both shall appear on the label. Where required, the brand and model text can be placed on 2 lines centered with in the available space. Where the list of models is very long, consideration should be given to the use of a 'family designation' to represent all of the models covered by the label/application. Rules for the use of family names can be found in this standard.
(d) Field d All models shall include this text and the associated check boxes. `Yes' shall be ticked if the model incorporates a variable output compressor (see MEPS requirement as per BDS1852:2012). Otherwise, 'No' shall be ticked.
(e) Field e All models shall include this text and the associated check boxes A tick shall

be included in the appropriate box or boxes if the model is capable, or potentially capable of meeting the demand response mode or modes (see MEPS requirement as per BDS1852:2012). Where the model is not capable, or potentially' capable of meeting a particular demand response mode that box shall be left blank.

NOTE: In addition to the requirements of this Section, label dimensions should be in accordance with Appendix D. Additional material to assist in the printing of labels may be available from, and any queries regarding such should be directed to, the relevant regulatory authority.

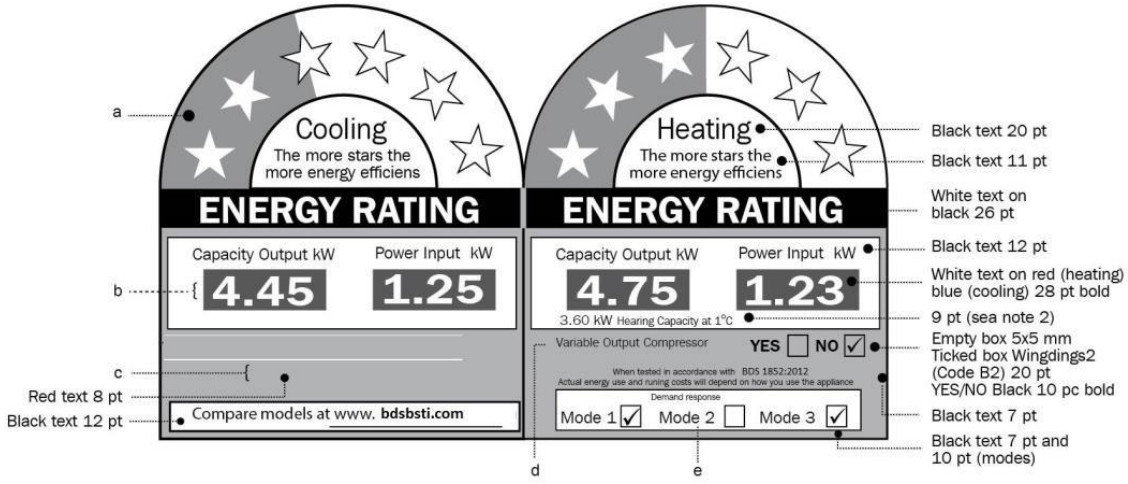
Manufacturers may indicate on the energy label the tested heating capacity for condition H2 as illustrated in Figure 4.1 and Figure D4. While this is a voluntary requirement, only those products that are registered or listed as meeting these requirements may indicate this information on the energy label. Products that are 'demand response capable' in accordance with MEPS requirement as per BDS1852:2012 may indicate the available modes in a white rectangle as shown.

Appendix D provides more details regarding dimensions.

4.6 Sample Labels

Examples of printed energy labels for air conditioning appliances are shown in Figures 4.2, 4.3, 4.4 and 4.5.

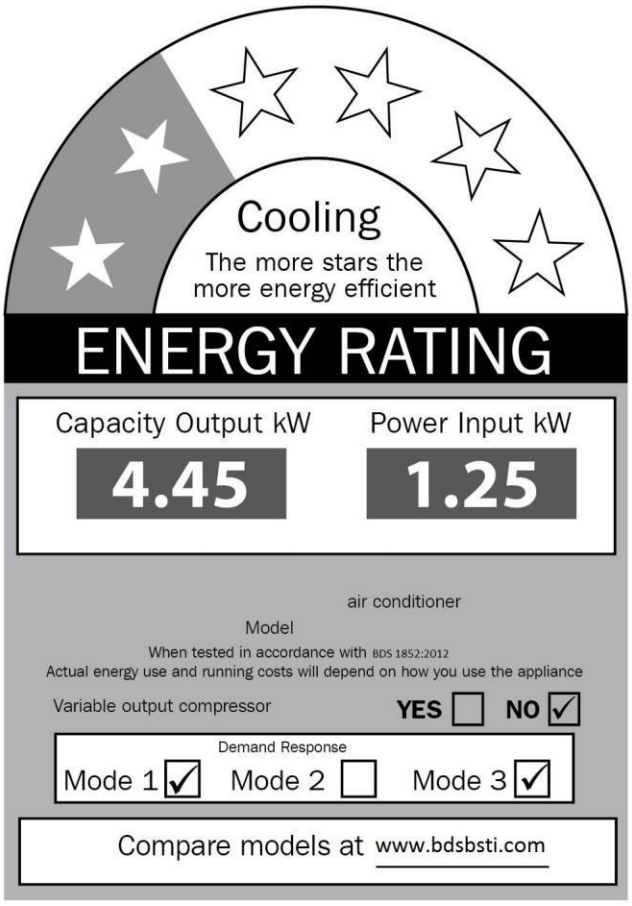
A1



A1 NOTES:

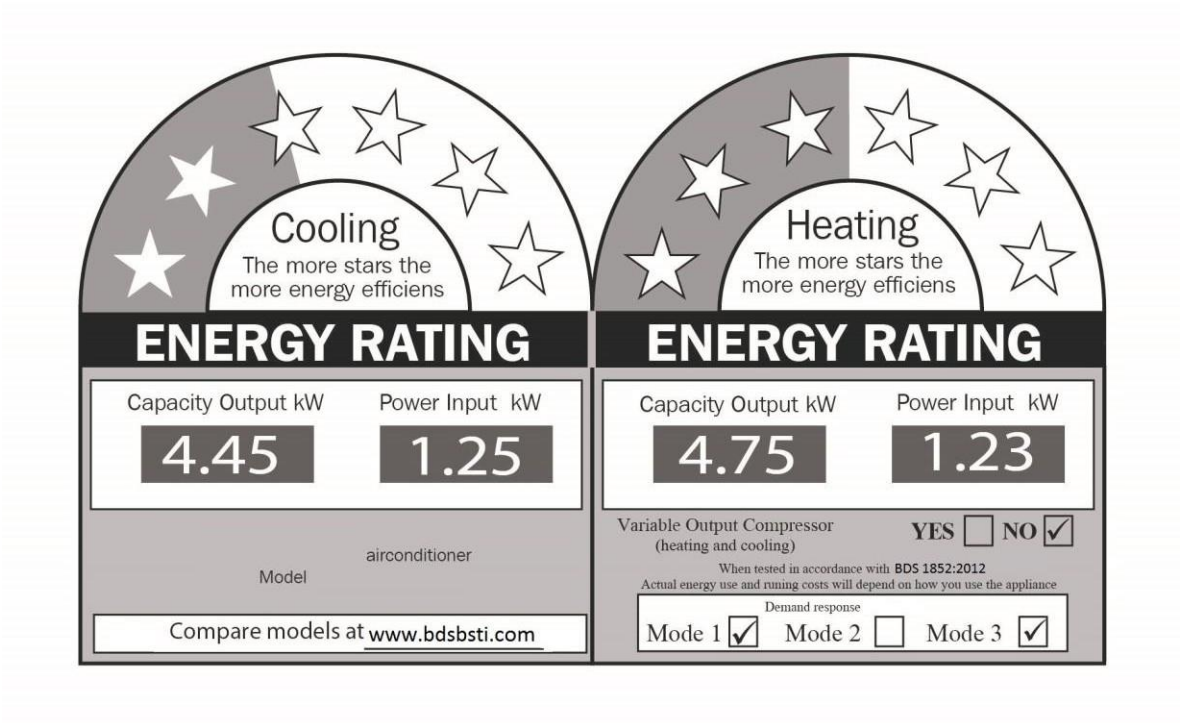
1. Preferred label width for each label element is 90 mm. For online printing, the external diameter of the red/blue star rating arch may be reduced to 86 mm to allow for a +2 mm registration error such that the red print does not extend over the label edge or result in a white band underneath it (see Appendix D).
2. Manufacturers may indicate the tested heating capacity for Condition H2 on the energy label, as illustrated only where the product meets the minimum COP requirements specified in MEPS requirement as per BDS1852:2012 and where the product is registered or listed as meeting these requirements. Details for dimensions with and without text are provided in Figures D2 and D3.
3. The fields (a), (b), (c), (d) and (e) of this Figure, are to contain the information as required by Clause 4.5.
4. Font definitions for the reverse cycle label in this Figure are also applicable to cooling only and heating only labels.
5. See Clause 4.3 for specification of colors. On some printers and display devices, the colors in this sample label may appear different to those specified.

Figure 4.1 Details of Label—Heating and Cooling Unit



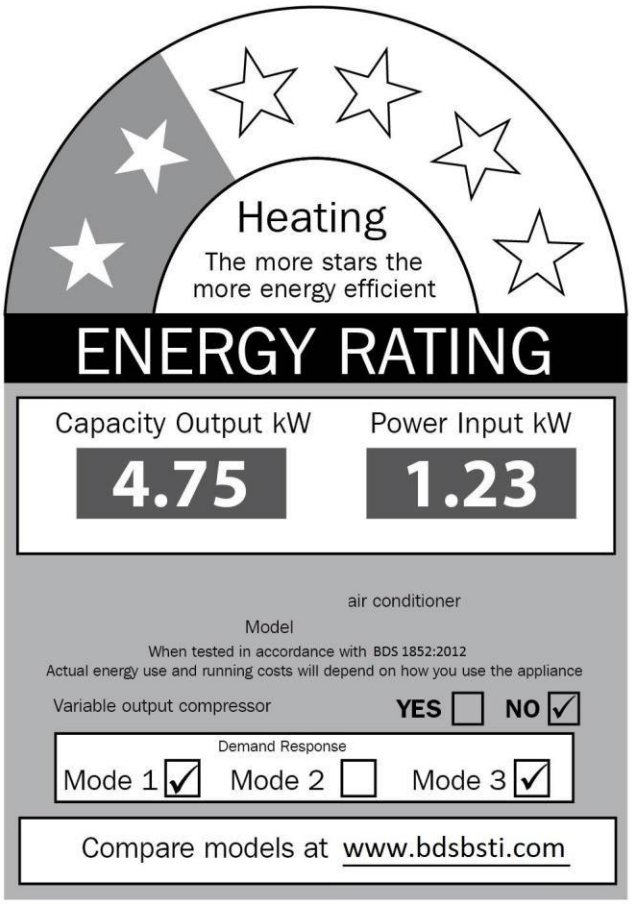
NOTE: See Clause 4.3 for specification of colors. On some printers and display devices, the colures in this sample label may appear different to those specified.

Figure 4.2 Example of Label─Cooling only Unit



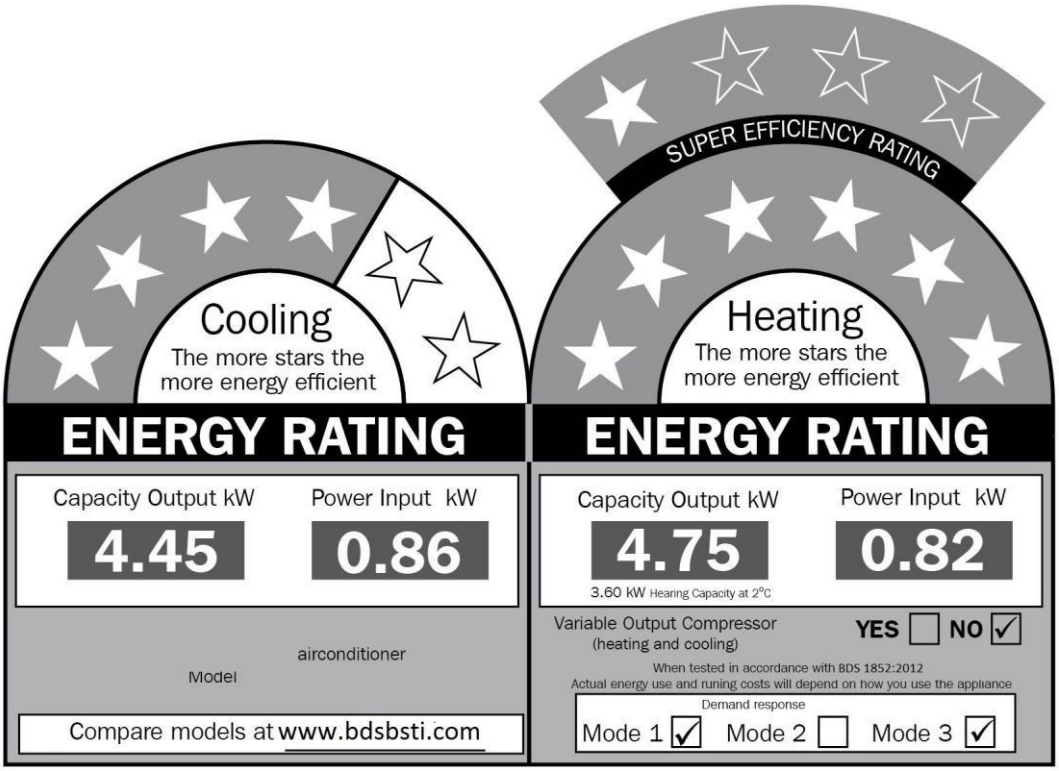
NOTE: See Clause 4.3 for specification of colours. On some printers and display devices, the colours in this sample label may appear different to those specified.

Figure 4.3 Example of Label– Heating and Cooling Unit



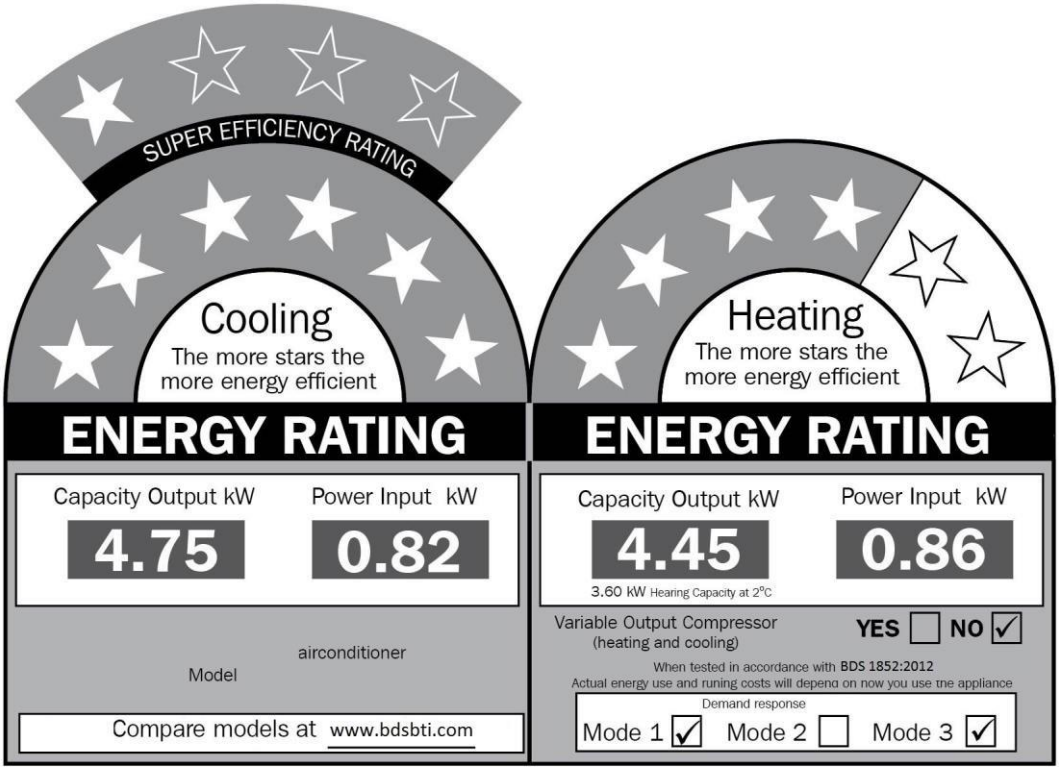
NOTE: See Clause 4.3 specification of colours. On some printers and display device, the colours in the sample label may appear different to those specified.

Figure 4.4 Example of Label–Heating only Unit



NOTE: See Clause 4.3 specification of colours. On some printers and display device, the colours in the sample label may appear different to those specified.

Figure 4.5 Example of Label with all Optional Text Shown–Heating



NOTE: See Clause 4.3 specification of colures. On some printers and display device, the colures in the sample label may appear different to those specified.

Figure 4.6 Examples of Label with all Optional Text Shown-Cooling

Appendix A
Examples of Energy Efficiency Calculations
(Informative)

A1 General

This Appendix provides an example of energy efficiency calculations. Paragraphs A2 and A3 show the calculations involved in the determination of the energy label details for a hypothetical single-phase reverse cycle household air conditioner for MEPS and energy labelling and the determination of SRI and star rating.

A2 Test Results, Averages and Rated Values

A2.1 General

A hypothetical single-phase reverse cycle window/wall household air conditioner is considered for energy labelling.

On cooling, it has a rated capacity of 4.45 kW with a: rated power input of 1.50 kW. On heating, it has a rated capacity of 4.75 kW with a rated power input of 1.49 kW. When not operating, this model has a declared and measured non operative power consumption of 5.3 W when determined in accordance with Clause 2.4. It does not have a crankcase heater.

This unit is a single-phase air conditioner within the scope of guideline and according to Appendix E, compliance requirements are for labeling.

Data from testing one sample in accordance with this guideline is shown in Tables A1 and A2. Values are for condition T1 for cooling and condition H1 for heating.

A2.2 Calculation of AEER and ACOP

The tested AEER and ACOP has to be calculated in accordance with Clause 2.5 in order to assess MEPS compliance and the label star rating.

$$AEER = \frac{[4.415 \times 2000]}{[1.53 \times 2000] + [5.3 \times 6.76]} \ldots\ldots A2.2(1)$$

$$AEER(Tested) = 2.8708$$

Similarly, the rated AEER also needs to be calculated. In this case it is 2.9317.

$$ACOP = \frac{[4.772 \times 2000]}{[1.53 \times 2000] + [5.3 \times 6.76]} \ldots\ldots A2.2(2)$$

$$ACOP(tested) = 3.0829$$

Similarly, the rated ACOP also needs to be calculated. In this case it is 3.1501.

A2.3 Verification of MEPS Requirements as per BDS1852:2012

Before the energy labelling details are calculated, the unit should be checked for MEPS compliance.

In order to verify that this particular model complies with MEPS, the unit is required to meet or exceed the MEPS levels for that model as per BDS1852:2012 for cooling and heating. The AEER (tested) in Table A1 is 2.8708 while the AEER (rated) is 2.9317. The ACOP (tested) in Table A2 is 3.0829 while the ACOP (rated) is 3.1501.

This unit complies with the MEPS requirements (unitary non-ducted <10kw) as the rated and tested AEER and ACOP exceed the minimum values specified in BDS1852:2012 (i.e. AEER and ACOP ≥2.84).

A 2.4 Verification of Rated Values

The test results should now be analyzed to ensure that they verify the claimed rated values as specified in Clause 2.3.3. For capacity and effective power input, the test value for the test unit is compared with the rated values to ensure that they lie within the required limits.

A summary of the verification comparisons for cooling and heating are contained in Table A3 and A4.

Table A1 Cooling Test Results

Specification		**Rated**	**Tested unit 1**	**Tested / Rated**
Total cooling capacity	(kW)	4.45	4.415	0.992
Effective power input Operating EER	(kW)	1.50 2.9667	1.52 2.9046	1.013 0.979
AEER		2.9317	2.8708	-

Table A2 Heating Test Results

Specification	Rated	Tested unit 1	Tested / Rated
Healing capacity (kW)	4.75	4.772	1.004
Effective power input (kW)	1.49	1.53	1.027
Operating COP	3.1879	3.1190	0.978
ACOP	3.1501	3.0829	-

Table A3 Verification of Rated Cooling Specifications— (Proportion of Rated Result)

		Verification
Tested/Rated	Unit 1	limit for
		each unit
Total cooling capacity	0.992	≥ 0.95
Effective power input	1.013	≤ 1.05

NOTES: 1. The tested value for total cooling capacity is greater than 0.95 of the rated capacity for each unit, so the rated capacity is valid.

2. The tested value for effective power input is less than 1.05 the rated power for each unit so the rated power is valid.

Table A4 Verification of Rated Heating Specifications— (Proportion of Rated Result)

Tested/Rated	Unit 1	Verification limit for each unit
Heating capacity	1.004	≥0.95
Effective power input	1.027	≤1.05

NOTES:
1. The tested value for heating capacity is greater than 0.95 of the rated capacity for each unit, so the rated capacity is valid.
2. The tested value for effective power input is less than 1.05 of the rated power for each unit, so the rated power is valid.

A3 Calculation of Star Rating Index (SRI)

SRI for cooling and heating are calculated from the applicable equations in Clause 2.6. Note that the tested values for AEER and ACOP (not the rated values) are used to calculate SRI.

Example: Cooling

$$SRI\ Cooling = \frac{[(AEER \times 8) - 18]}{4} \ldots\ldots\ldots 2.6(1)$$

$$SRI\ Cooling = \frac{[(2.8708 \times 8) - 18]}{4} = 1.2416$$

$$Star\ Rating = 1.0\ Stars$$

Example: Heating

$$SRI\ Heating = \frac{[(ACOP \times 8) - 18]}{4} \ldots\ldots\ldots 2.6(1)$$

$$SRI\ Heating = \frac{[(3.0829 \times 8) - 18]}{4} = 1.6658$$

$$Star\ Rating = 1.5\ Stars$$

Star rating is as given in Table 2.1. Therefore, the cooling star rating for this model is 1.0 and the heating star rating for this model is 1.5

Appendix B
Fomate of Application for License of an Air Conditioner for Energy Labeling
(Normative)

B1 Introduction

Applicants who wish to have their products licensed for energy labelling are required to provide the information set out in this Appendix.

Notes:

1. The contact details supplied by the applicants in this form or online may be used by other Government agencies to keep applicants informed of forthcoming regulatory changes that may affect the product registered under this standard. Otherwise, contact details are treated as private and confidential.
2. Notice of Right to Disclose Information─The information you submit on this application will be used for purpose of assessing your application and the performance of statutory responsibilities. The information that you have submitted may be disclosed to other energy regulatory bodies of home and abroad who may use the information only for the purpose of carrying out their duties and or responsibilities including comparing efficiency claims. The information will also be entered onto the register or database or both.

B2 Scope

This Appendix sets out an example of the required additional format for submitting an application for license from regulators.

B3 Guidance on the Use of This Application Form

B3.1 General

The Appendix has been formatted and structured to align with the both online and manual application system for energy labeling which ever method applicant intend to take.

B3.2 All License

Only a single unit needs to be tested and report submitted when applying for energy labeling according to guideline. Any units that carry an energy label shall be accompanied by a physical test (simulation for energy labelling is not permitted).

B3.3 Submission to Regulator

Applicants who have licensed their products or intend to from the regulator must have a registered office as to do business in Bangladesh by manufacturing or assembling or importing air conditioner as he can held responsible.

B3.4 Initial Questioner form of an Application Form for License of an Air Conditioner for Energy Efficiency

Questioner Details

I hereby apply for license of an electrical appliance/s for the purpose of energy labeling (where applicable).

Applicant Details					
Name of Applicant:					
Company Name:					
Company Address:					
Contact person: (A name, address and contact details for a person in Banglades h shall be provided)	Name: Address: Position/Title : Telephone: Mobile: e-mail:				
The guideline to which this application is made?				Energy Label Requirements for Air Conditioners	
Related Standard				BDS 1852:2012	
What is this application for?				Labeling	
Is this product to be used exclusively for commercial applications?				Yes/No	
For commercial single-phase non-ducted units - Are you seeking an exemption from energy labeling for this product? - (An exemption requires a separate submission to regulators (refer clause 1.2(f))				Yes/No	
Is this application for a single model or a family of models? *(indicate correct answer)*				Single/Family	
Section 3 Description of Appliance					
Brand Name:					
Models designation (List all models covered by this application. this can either by be a number or name or combination of the two that will identify the particular product. Add additional roes if more than 3 models)		System Name	Indoor Unit*	Outdoor Unit*	
	Model 1				
	Model 2				
	Model 3				
	*Indicate only for split system				
Family model designation, if applicable for above models:					
Model/family number(s) to appear on the energy rating label where provided and on the license (indicate correct answer)	Display List of individual models noted above Or Family model designation noted above				

Country of manufacturer	Bangladesh/Other-please specify		
Where is this product is to be sold: (indicate each country)	Bangladesh/Other-please specify		
Year and month in which model first available in Bangladesh	Year	Month	
Date of manufacture traceability (of package unit or indoor unit if split system) Is the date of manufacture permanently marked on the rating plate in a non-encrypted format? If yes, provide an example of the date format. If no, provide details on how to determine on how to determine(from the serial number or other permanent marking for this model) whether the date of manufacturer was either─ (a) in the 5 year period prior to the introduction of MEPS; or (b) in the 5 year period subsequent to the introduction of MEPS	Yes Date format:	No provided details:	
Date of manufacturer traceability (of outdoor unit if split system): Is the date of manufacturer permanently marked on the rating plate in a non-encrypted format? If yes, provide an example of the date format. If no, provide details on how to determine on how to determine(from the serial number or other permanent marking for this model) whether the date of manufacturer was either─ a) in the 5 year period prior to the introduction of MEPS; or b) in the 5/3 year period subsequent to the introduction of MEPS	Yes Date format:	No provided details:	
Does this model or family replace or supplement another model or family with identical energy consumption and energy efficiency rating? *(indicate correct answer)*	Yes/No		
If yes, indicate relevant details:	Model Name	Model Number	Registration Number

Section 4 Testing and Test Report				
Is a test report or a summary report in accordance with Appendix C attached? *(indicate correct answer)*	Yes ─ A single physical test report is attached Yes─A summary report to Appendix C is attached No ─ No test reports are attached			
If no report is attached, note the source license number of the appliance upon which this application relies for its report: *(proceed to section 5 if no report attached)*				
Test laboratory type: *(indicate correct answer)*	Own 'in house' laboratory: Independent laboratory:			
Test laboratory name:				
Test laboratory address:				
Test laboratory location: *(indicate correct answer)*	*please specify country name:*			
Test laboratory accreditation:	*please specify organization name:*			
Test standard used: *(indicate relevant Standard, year, revision and any amendment)*	*non-ducted:* *ducted:* *water sourced/cooled:* *simulation:* *other ─ (please specify):*			
Test Report numbers: *(fill in as applicable)*				
Does this air conditioner have separate indoor and outdoor units?	Yes/No			
Test Room ─ indoor type used:	Calorimeter/Enthalpy test room/not applicable (simulation)			
Test Room ─ outdoor type used:	Calorimeter/Enthalpy test room/water loop equipment/not applicable (simulation)			
Serial number of test unit/s and date tested: (Fill in the fields as applicable to the application ─ Unit 2 and 3 only need to be filled in for labelling application.	Test Unit	Serial Number Unitary unit or indoor unit if split system	Serial Number Outdoor unit if split system	Test date
Rated voltage and frequency of tested unit/s			Unitary unit or indoor unit if split system	Outdoor unit if split system
	Rated voltage range (V)		─	─

	Rated frequency (Hz)		
Rated voltage and frequency of tested unit/s		Unitary unit or indoor unit if split system	Outdoor unit if split system
	Tested voltage (V)		
	Test frequency (Hz)		

Section 5 Specific Appliance Details

Appliance dimensions (Advisory only): *(for split systems note only dimensions of the internal unit)*	Width (mm):	Height	
Air conditioner type: *(indicate correct answer)*	Cooling only Reverse cycle Heating only		
Power supply:	Single phase Three Phase		
Refrigerant:	R22, R114, R502, R134, R32, R123,R124, R125 R143A, R152A, R290, R410A, R3212560, R507 R14312555, R404, R407 Other (please specify)		
A/C Configuration 1—Air distribution: *(indicate correct answer)*	Ducted/Non-Ducted		
A/C Configuration 2—Type: *(indicate correct answer)*	Window/Wall Spot cooler Portable cooler Single split system Double/triple split system Multi split system Packaged Packaged		
Non-ducted split system indoor unit mounting	Wall-hung Under celling		
	Floor mounted		
	Cassette		

	Floor/Ceiling	
A/C configuration 3─Heat transfer: *(indicate correct answer)*	**Heat source (heating)** Air Cooling tower (reversible) Water loop (refer to related standard) N/A ─ Cooling only	**Heat sink (cooling)** Air Cooling tower Water loop (refer to related standard) N/A ─ Heating only
Does this air conditioner have variable output capacity? *(indicate correct answer)* If variable output is obtained by use of a variable output compressor, state type:	Yes/No Invertor Digital scroll Multi-stage Other (state type)	
If variable output is obtained by means other than a variable output compressor, state type:	Thermostatic expansion valve Multi compressors Variable speed fan systems Other (state type)	

Section 6 Test Results

TEST RESULTS ─ COOLING ─ CONDITION T1		
COOLING POWER	Rated effective power input (kW)*	
	Tested cooling power input ─ Test 1 (kW)**	
TOTAL COOLING CAPACITY	Rated sensible cooling capacity (kW)*	
	Rated dehumidifying effect (kW)* NOTE: 1 liter water extracted per hour = 0.683 kW	
	Rated total cooling capacity (kW)*	
	Tested total cooling capacity ─ Test 1 (kW)**	
EER	EER ─ Test 1**	
Does the air-cooled condenser evaporate the condensate? *(indicate correct answer)*		Yes/No
Indicate fan and any other settings for determination of rated capacity:		
For ducted systems, indicate air flow rate (cubic meters/second):		
If inverter driven, state the frequency of the inverter at rated capacity for cooling (Hz):		
Indicate method of obtaining fixed output on air conditioners with variable output capacity:		
For ducted systems, indicate air flow rate (cubic meters/second):		
For ducted systems, indicate static pressure (Pa):		
Average true power factor for the cooling test:		

Does this model comply with the maximum cooling test for Condition T1: *(indicate correct answer)* Note: This only applies to applications for energy labeling – If the application is for MEPS only then select N/A. Supply a test report on a single unit to support this claim (see Clause 2.9).	Yes/No/N/A

*to 2 decimal places

*to 3 decimal places

Test Result–Heating–Condition H1		
Does this model incorporate electric resistance heating? *(indicate correct answer)*		Yes/No
HEATING POWER	Rated effective power input (kW)*	
	Tested heating power input–Test 1 (kW)** *(Fill in for labelling applications only)*	
HEATING CAPACITY	Rated total heating capacity (kW)*	
	Tasted heating capacity– Test 1 (kW)** *(Fill in for labelling applications only)*	
COP	COP–Test 1** *(Fill in for labeling applications only)*	
Indicate fan and any other settings for determination of rated capacity:		
For ducted systems, indicate air flow rate (cubic meters/second): If inverter driven, state the frequency of the inverter at rated capacity for heating (Hz):		
Indicate method of obtaining fixed output on air conditioners with variable output capacity:		
For ducted systems, indicate static pressure (Pa):		
Average true power factor for the heating test:		

*to 2 decimal places

*to 3 decimal places

RESULT SUMMARY		
Does the average power for the highest power user selectable non-operative model vary in accordance with ambient or other conditions? If Yes, state the factors that have been used to determine the average power level in accordance with Appendix G. (Refer to Clause 2.4) Where factors other than (a), (b) or (C) above affect the non- operate power detailed documentation on the relevant factors and their impacts shall be submitted with this license (refer to Paragraph G1 (e)) either in test report summary (Appendix C) or as a separate report attached to the license.		Yes/No (a) Temperature distribution (Table G1) (b) Operating schedule (c) (a) and (b) above. (d) Other

	COOLING	HEATING
State the non-operative power for cooling *(P_{noc}) and heating* (P_{noh}) mode as applicable determined in accordance with Clause 2.4:		
Tested EER and COP (as applicable):		
AEER and ACOP(as applicable) (Refer to Clause 2.5)		
For energy labelling applications only:		
Star Rating Index Cooling and Heating (as applicable) (Refer to Clause 2.6):		
Star Rating Cooling and Heating (as applicable) (Refer to Clause 2.7):		

Section 7 Low Temperature Heating Performance

NOTE: This section is to be filled in only by those manufactures that wish to indicate the tested heating output on the energy label for Condition H2. To be eligible for a license, products must meet the requirements of clause 3.7, which indicates that they are
suitable for cold climate heating applications. Heating capacity output and COP at H2 will be declared in the license.

Have you supplied a test report for heating performance for condition H2 as part of this application:	Yes/No

HEATING RESULTS FOR CONDITION H2

Data provided shall be for maximum continuous heating output for condition H2 and shall include the impact of any regular defrosting events.

HEATING POWER	Tested heating power input (kW)**	
HEATING CAPACITY	Tested total heating capacity (kW)**	
COP	COP (W/W) Where applicable indicate method of obtaining fixed output on air conditioners with variable output capacity	

Section 8 Declaration–Demand Response Capability

NOTE: This section is to be filled in by all suppliers. Any demand response capability must be indicated in this registration form. Suppliers have the option if indicating demand response capability on the energy label if the product as supplied has the capability included (built in). (Refer
BDS 1852:2012) This information will be included in the appliance listing on license.

Does the model have a demand response capability in accordance with this standard built into the product and is it ready to use as supplied? (Demand response capable)	Yes/No
If yes, where the product is registered for energy labelling, does it indicate that is demand response capable in accordance with this standard on the energy label?	Yes/No

Does the model have a demand response capability in accordance with this standard with the addition, purchase and/or installation of a separate part? *(indicate correct answer)* If yes, indicate part number to make the system demand response capable in accordance with relevant standard.	Yes/No	
Does the product have demand response mode capability DRM 1 in accordance with relevant standard. Note: Mode 1 is mandatory in order to claim compliance with relevant standard.	Yes	
Does the product have demand response mode capability DRM 2 in accordance with relevant standard. *(indicate correct answer)*	Yes/No	
Does the product have demand response mode capability DRM 3 in accordance with relevant standard. *(indicate correct answer)*	Yes/No	
For variable output products that do not meet MEPS at rated output, does this model comply with the requirement of Clause 3.3? (refer section 9) Note: Only applicable for MEPS 2010 and MEPS 2011.		Yes/ No