



**Bureau of
Energy Efficiency**

Ministry of Power, Government of India

Packaged Boiler Schedule

| Sr. No | Version | Details of changed/Added in the Schedule | Date of change/Modification |
|---------------|----------------|--|------------------------------------|
| 1 | 2.0 | In place of the fuel type "Solid Fuel" has been replaced with "Coal". | 19/04/2024 |
| 2 | 2.0 | Clause 11.5, "Production Label Fee" has been added to Clause 11. | 19/04/2024 |
| 3 | 2.0 | "Each unit of registered boiler sold on a quarterly basis" has been replaced with "Each unit of registered boiler sold on a annual basis". | 19/04/2024 |
| 4 | 2.0 | In Clause 13.2, "Safety Certificate" has been changed to "Indian Boiler Regulation Certificate". | 19/04/2024 |



Date: 19th April, 2024

Version 2.0

Schedule 36 **Packaged Boiler**

1. SCOPE

This schedule specifies the requirement for participating in the star labeling program for Packaged Boilers using coal, biomass, oil and natural gas as fuel across all capacities under Indian Boiler Regulation (IBR) with or without air pre-heater, economizer, or waste heat recovery system, covered under the scope of IS 13979: 1994 as amended from time to time, being manufactured, imported or assembled for the purpose of commercial sale in India.

1.1 In particular, this schedule specifies the following:

- 1) Definitions
- 2) Reference Standard
- 3) Test Method and Guidelines
- 4) Test Report requirements
- 5) Star Rating plan
- 6) Validity period of the label.
- 7) Model registration process
- 8) Fee structure
- 9) Label design and its contents.
- 10) Check testing mechanism
- 11) Test report format

2. REFERENCE STANDARD

This schedule shall be read in conjunction with the following standards for the purpose of star labelling program:



| Reference Standard | Title of the Standard |
|---|---|
| IS 13979: 1994 as amended from time to time | Method of Calculation of Efficiency of Packaged Boilers |

3. TERMINOLOGY

For the purpose of this schedule, the following definitions in addition to those given in IS 13979: 1994 with as amended from time to time shall apply:

- 3.1 Family of models:** It is the range of models to which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, measured efficiency star rating and other performance characteristics.
- 3.2 Indian Boiler Regulation (IBR) compliant Boilers –** In compliance with IBR regulations, these boilers exhibit water holding capacity exceeding 25 liters and steam pressure of 3.5 Kg/cm². They support varying capacities, ranging from 1 tonne/hour to 1,650 tonnes/hour, and are extensively used in the Auto, Pharma, Chemical, Sugar, Cement and Power sectors.
- 3.3 Label:** Any written, printed, marked, stamped or graphic matter affixed to, or appearing on the product and the packaging provided always that the product inside the packaging to which the label is thus applied conforms to every requirement of this schedule.
- 3.4 Label Period:** It is the label validity period of the thermal efficiency standards provided under the star rating plan as specified in the schedule.
- 3.5 Non-IBR compliant Boilers –** They comply in part with IBR regulations, ensuring that either water holding capacity or steam pressure is kept constant. Available from 0.05 tonnes/hour – 0.85 tonnes/hour capacity, they are widely used in both industrial and commercial segments.
- 3.6 Packaged Boiler:** “Packaged Boiler” means any closed vessel which is used specifically for generating steam under pressure and includes any mounting or other fitting attached to such vessel, which is wholly or partly under pressure when steam is shut off, and is certified as per Indian Boiler Regulation.



3.7 Star Rating: The number of stars displayed on the star 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 on the basis of thermal efficiency.

3.8 Star Rating Band: The Star Rating Band is a range of thermal efficiency which is arrived at by an established tests method and calculations and is used for determining the number of stars to be displayed on the Star Label.

3.9 Validity of Label: The validity period of Thermal Efficiency Rating table specified in this schedule.

4 TESTING PARAMETERS

4.1 Thermal Efficiency: The test shall be carried out as per IS 13979:1994 by indirect method on N.C.V. (Net Calorific Value) basis.

5 TESTING GUIDELINES

5.1 Methods of Tests: The methodology and the test protocol for measurement of the thermal efficiency specified in this schedule shall be as per IS 13979:1994 as amended from time to time (if any). The efficiency parameter for the allotment of star ratings under this scheme shall be based on Thermal Efficiency by indirect method on N.C.V. basis.

5.2 The guidelines for testing shall be in accordance with clause 4.2, 4.4, 4.5, 6 and 7.2 of IS 13979:1994.

5.3 The analysis of the fuel and unburnt combustible in the refuse and other parameters specified in **Annex - A** of IS 13979 shall be carried out in accordance with the method given in 5.4, 5.5 and 5.6. The report of analysis of all the applicable parameters shall be as specified in E of **Annex - A**.

6 TEST REPORT

6.1 Test reports from NABL accredited test agencies for field testing of the unit installed at the site as per IS 13979 shall only be accepted.

6.2 The report of fuel analysis and refuse analysis of the unburnt fuel/combustible shall only be accepted from a NABL accredited laboratory or any other accreditation bodies who are signatory to MRA with APAC and/or ILAC.



- 6.3** The calibration certificate for measurement equipment used in testing shall be accepted only from a NABL accredited laboratory or any other accreditation bodies who are signatory to MRA with APAC and/or ILAC.
- 6.4** Test report submitted at the time of registration of the model should not be older than 3 months.
- 6.5** The test result shall be reported in the prescribed format as given in **Annexure - A** of this schedule.
- 6.6** Other parameters like observed values of various parameters during measurement, constant quantities, system data and data on fuel and refuse analysis shall be recorded and reported along with the test report as given in **Annexure - A** of IS 13979.

7 TOLERANCE LIMIT

For the purpose of rating allotment, tolerance limits shall be applicable only on measured parameters tested as per IS 13979:1994. The declared Thermal efficiency value shall be considered valid if the measured efficiency lies within their tolerance limit as defined in clause 4.3 of IS 13979:1994.

During check testing, the model must comply with its star rating as per the thermal efficiency band specified in rating plan.

8 RATING PLAN

The star rating parameter for the labelling program shall be Thermal Efficiency by indirect method on N.C.V. (Net Calorific Value) basis.

Thermal Efficiency thresholds for Coal, Biomass, Oil & Natural Gas fired Packaged Boilers is shown in **Table - 1**.



Table - 1
Star Rating Plan – Voluntary Phase
(Valid from 1st March, 2024 to 31st December, 2026)

| Star Rating | Thermal Efficiency (%) on NCV basis (data points) | | | |
|-------------|---|------------------|------------------|------------------|
| | Natural Gas | Oil | Coal | Biomass |
| 1 Star | >= 88% and < 92% | >= 88% and < 90% | >= 80% and < 82% | >= 80% and < 82% |
| 2 Star | >= 92% and < 94% | >= 90% and < 92% | >= 82% and < 84% | >= 82% and < 84% |
| 3 Star | >= 94% and < 96% | >= 92% and < 94% | >= 84% and < 86% | >= 84% and < 86% |
| 4 Star | >= 96% and < 98% | >= 94% and < 96% | >= 86% and < 88% | >= 86% and < 88% |
| 5 Star | >= 98% | >= 96% | >= 88% | >= 88% |

9 COMPANY REGISTRATION

For participating in the Packaged Boiler Star Rating program, the manufacturer has to first register his organization. The manufacturer shall submit to BEE all necessary documents required as per BEE guidelines. BEE after scrutiny and subject to submission of all documents by the manufacturer shall grant company registration to the organization/manufacturer to participate in BEE's Packaged Boiler labelling program.

10 MODEL REGISTRATIONS

10.1 For a Star Rating label, manufacturer shall apply on BEE's S&L website (www.beestarlabel.com) along with a valid test report of the model/family of models and other documents as required for registration process.

10.2 The manufacturer may register a packaged boiler model under star labelling program, with a physical test report from NABL/ILAC /APAC accredited lab tested as per the test conditions mentioned in IS 13979:1994. In the absence of above, BEE may also accept test report from manufacturer's self-test facility accredited by national accreditation body having scope of the tests mentioned in IS 13979:1994.

10.3 NABL/ILAC /APAC accredited laboratory will undergo for testing of a packaged boiler model at site of installation in presence of manufacturer. Manufacturer shall submit the test report to BEE to accord formal approval for the model registration.



- 10.4** All measuring instruments for testing the energy performance values of boiler shall be calibrated on regular basis and shall have accuracy as per clause 4.2.7 of IS 13979:1994.
- 10.5** The manufacturer shall submit the test reports of thermal efficiency, calorific value of fuel, etc. as per **Annexure - A** of this schedule.
- 10.6** Manufacture shall submit the test report comprises of thermal efficiency, calorific value of fuel, etc., as per **Annexure - A** of this schedule to BEE to complete the process of Registration and Star Rating allotment for the model/family of models.

11 FEES

- 11.1** For the purpose of registration with BEE, every permittee would be required to deposit a refundable label security fee of INR 1,00,000/- (Rupees One Lakh Only), payable by only electronic mode in favor of the Bureau of Energy Efficiency, New Delhi. In case of small-scale industries (SSI units), the label security fee shall be INR 25,000/- (Rupees Twenty-five thousand only), provided they submit the valid SSI registration certificate.
- 11.2** Application fee payable for a new model registration shall be INR 2,000/- (Rupees Two thousand only), payable by only electronic mode in favor of the Bureau of Energy Efficiency, New Delhi.
- 11.3** No application fee is payable on application for renewal of permission to affix label on model.
- 11.4** Labelling fee for affixation of label on each unit sold of the registered boiler model is INR 200/- (Rupees Two Hundred Only) per Tonne per Hour (TPH). The labelling fees also shall be submitted by manufacturer through the online portal on a quarterly basis.
- 11.5** Every permittee shall furnish to the Bureau a statement containing details of the production of labeled equipment for each financial year within one month from the date of closure of each financial year. The accrued label fee shall be paid annually within one month from the date of closure of each financial year.
- 11.6** Boiler Manufacturer will be required to update BEE with basic details such as model number, model name, capacity, thermal efficiency, test report number applicable, customer's installation location address, commissioning status, etc. for each unit of registered model sold at the end of each financial year on BEE's online portal.



12 LABEL DESIGN AND MANNER OF DISPLAY

12.1 Label Content

The content of the label shall include the following information:

1. Product Name: Packaged Boilers
2. Type of Boiler:
3. Brand:
4. Model Name/Number:
5. Thermal Efficiency, η (%):
6. Fuel Type:
7. Capacity (TPH):
8. Pressure (Kg/cm²):
9. Star Rating Level:
10. Year of Manufacturing:
11. Label Period:
12. Energy Saving/ Year (TOE):
13. CO₂ Emission Reduction/ Year (KgCO₂):
14. Reference standard:

12.2 Placement of label and QR Code

With an intent to authenticate the star rating approval issued for a model of packaged boiler, BEE will share the printable/readable version of the dedicated QR code for each model along with approval letter with manufacturers. The QR code is recommended to be placed just below the star label being affixed on each unit of the packaged boiler. The QR code will contain the information as mentioned in Sub-Clause 12.1 under Clause 12 of Packaged Boiler Schedule.

The placement of the label along with QR code shall be at the discretion of the manufacturer where it has clear visibility, is not easily removable and also no possibility of the label and QR code getting spoiled over time.

12.3 Material, Dimension and Shape

The label shall be made of any corrosion resistant and durable material (aluminum anodized) and shall be screwed or riveted on the boiler as per the dimensions, design and colour scheme as given in Figure 1 to 3.

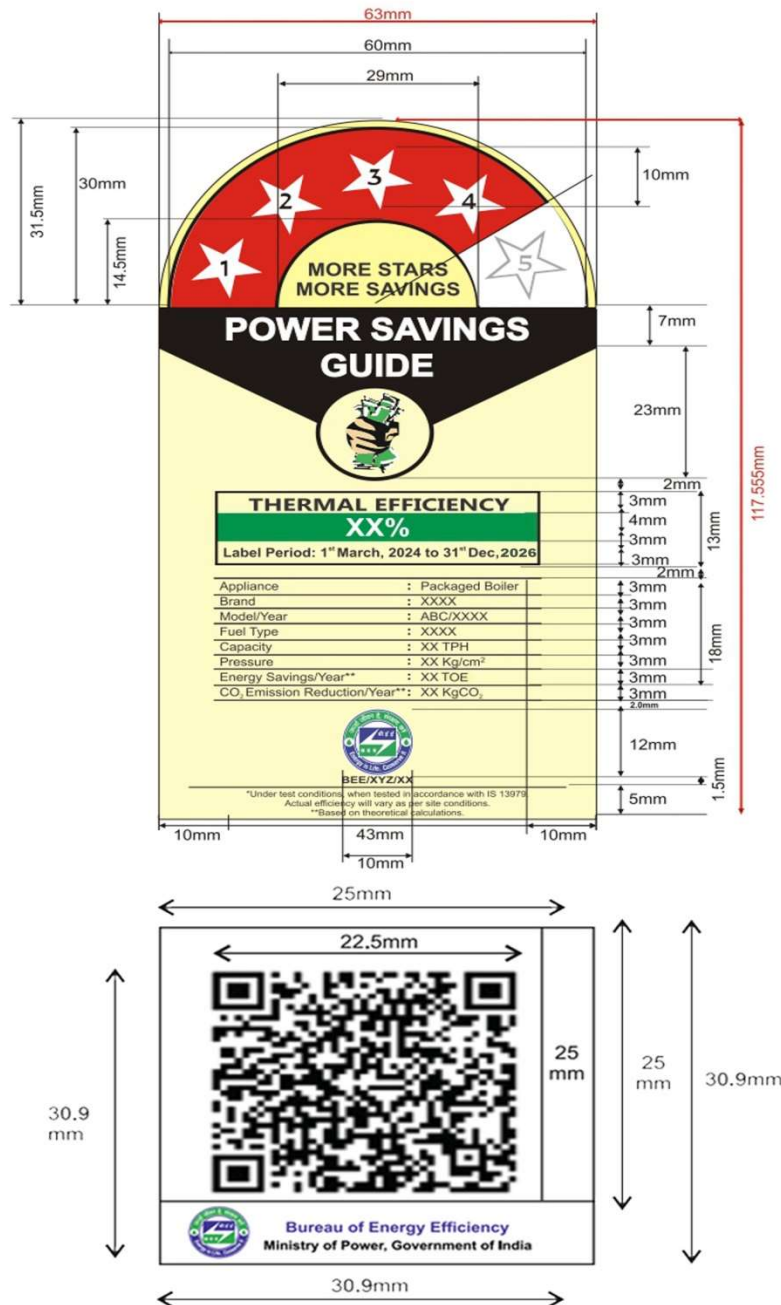


Figure 1 Dimension of the Label



12.4 Color scheme

The label shall be printed as per the color scheme given in Figure 2.

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 color 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 color code - #00AA56;

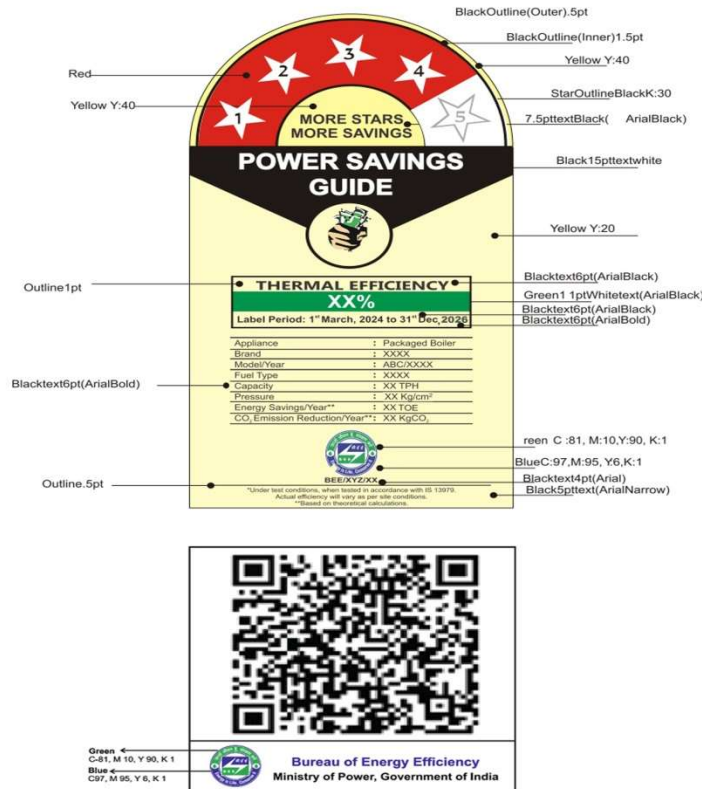


Figure 2 Color Scheme for the Label

12.5 Sample Label

An example of a star label to be affixed on the model is shown in Figure 3.

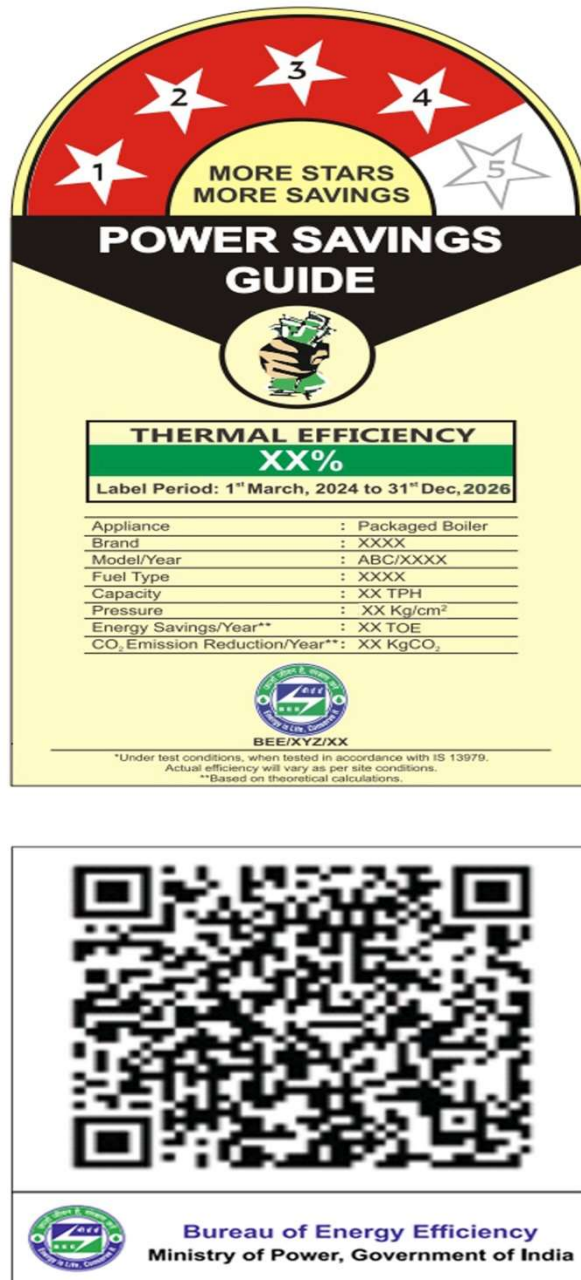


Figure 3: Sample Label



13 CHECK TESTING

- 13.1** Manufacturer will be required to share boiler installation and commissioning data with BEE for each unit of registered boiler sold on an annually basis. Manufacturer will be required to provide prior intimation at the time of registration to boiler customer or user at the time of sale of star labelled boiler about BEE's check testing at their site if the model is selected for check testing.
- 13.2** BEE shall conduct check testing on randomly selected boilers to ensure that the packaged boilers conform to the declared star level and other related information displayed on its label and that it complies with the other terms and conditions of permission. BEE may conduct the on-site check testing using annually data shared by manufacturer after the commissioning of the boiler and Indian boiler regulation (IBR) certificate.
- 13.3** All the tests shall be conducted by the BEE/ SDA or its authorized representative for the purpose of check testing. BEE shall authorize a NABL accredited test agency to conduct performance testing at the installation site of star labelled boiler.
- 13.4** For the purpose of check testing, one boiler installation site shall be selected by BEE at random from the installation and commissioning data shared by manufacturer for registered models/ family of models. The performance test will be conducted by BEE's authorized agency at the facility of boiler customer with prior intimation to the manufacturer and the customer. The manufacturer will be required to coordinate with BEE's appointed testing agency and the boiler customer for site testing.
- 13.5** Based on finding of the on-site test result reported to BEE by the empaneled test agency during check testing of the boiler, BEE would validate the check testing result and initiate further action, accordingly.
- 13.6** In case of failure of the model in first check testing, BEE shall conduct second check testing of the same single model available at the different user premises. The permittee / user of the label would be accordingly informed about the failure of the first check testing and shall be advised to deposit the cost of check testing in advance. If permittee fails to deposit/pay the expenses, Bureau shall continue the verification by check/challenge testing and stop further processing of new application received of the respective permittee. If the same model is not available, for second testing then check testing result of the first sample shall be treated as final and shall be binding on the permittee.



13.7 In case of failure in model during second check test, Bureau shall proceed with the following actions:

- Direct the permittee, under intimation to all the State Designated Agencies, that the permittee within a period of two months from the date of issuance of such intimation, shall-
 - a. Change the particulars displayed on advertising material & submit a fresh application with revised thermal efficiency declaration for the respective model/family of models.
 - b. Correct the star level displayed on the label of the equipment or remove the defects and deficiencies found during testing from the existing and new stock;
- Further, Bureau/SDA shall proceed to publish, for the benefit of the consumers, the name of the permittee, brand name, model name or model number, logo and other specification in any national or regional daily newspaper and in any electronic or in any other manner as it deems fit within two months;

13.8 The permittee, within ten days of the conclusion of the period of two months from the date of issuance of intimation as mentioned above shall send the action taken report on the prescribed format (please see **Annex - B**: Action Taken Report on failure of check testing from Permittee to BEE) with respect to action taken in compliance with the direction; and

Where the permittee fails to comply with the directions issued by the Bureau/ SDA, the Bureau under intimation to all other State Designated Agencies, shall-

- Withdraw the permission granted to the permittee;
- Initiate further adjudication proceedings against the permittee and the trader under section 27 of the EC Act.



ANNEXURE - A

Form for reporting test results / design appraisal

The results of tests shall be reported as per IS 13979:1994 as amended from time to time with the relevant sections from the mentioned appendix applicable and shall clearly mention the following:

1. General details of Model

Date of test:

Test report number:

Test officer:

As declared by the manufacturer:

| | | |
|----|--|--|
| 1 | Manufacturer/Brand: | |
| 2 | Model Number: | |
| 3 | Serial Number: | |
| 4 | Capacity (TPH / Kg / hour): | |
| 5 | Total Heating surface area (sq. m.): | |
| 6 | Pressure (Kg / sq. cm.): | |
| 7 | Working Fuel (Coal / Biomass / Oil / Natural Gas Fired): | |
| 8 | Construction Type (Stationery Grate /Inclined Grate/ Travelling Grate/ F.B.C. /Other): | |
| 9 | Tube Type (Smoke tube /Water tube /Hybrid Combination of External Water Wall Furnace & Smoke Tube /Small package/ Other): | |
| 10 | Firing Method (Auto / Manual): | |
| 11 | Waste Heat Recovery (Yes/No): | |
| 12 | Economizer (Yes/No): | |
| 13 | Air Preheater (Yes/No): | |



2. Percentage Losses and Thermal Efficiency

| S.No. | Parameter | Value |
|-------|--|-------|
| 1 | Loss due to combustible in refuse (LR) (%) | |
| 2 | Loss due to flue gas (LD) (%) | |
| 3 | Losses due to radiation, convection and conduction (L_{sn}) (%) | |
| 4 | Loss due to sensible heat lost through refuse (%) | |
| 5 | Unmeasured Losses (%) | |
| 6 | Total Losses (%) | |
| 7 | Measured Thermal efficiency (by Indirect Method) (On N.C.V. basis) = 100% – (Total Losses in %) | |
| 8 | Measured Calorific Value of Fuel (KCal/kg): | |

3. Star Rating declaration

| Parameter | Declared value |
|---|----------------|
| Thermal efficiency (by Indirect Method) (On N.C.V. basis) | |
| Calorific Value of Fuel (kJ/kg) | |
| Star Rating as applicable | |

Note 1: The declared performance values shall be used for the star rating.

Note 2: The declared performance values shall be considered as final values for the purpose of check testing conducted by BEE, SDA or its authorized representative. The measured performance values shall be verified based on the tolerance limits as per item 7 of this schedule.



ANNEXURE - B

Action Taken Report on failure of check testing from Permittee to BEE

Action Taken Report

(To be furnished on Company's letter head)

To,

Dated.....

THE SECRETARY,
BUREAU OF ENERGY EFFICIENCY
(MINISTRY OF POWER, GOVT. OF INDIA)
4TH FLOOR, SEWA BHAWAN,
SECTOR 1, R.K. PURAM,
NEW DELHI-110 066
INDIA.

Pursuant to the provisions of Schedule No. 36 of the Bureau of Energy Efficiency, we M/s.....the manufacturer of packaged boiler were permitted to affix label on the packaged boiler conforming to the energy consumption standard of star level vide BEE letter No.....dated.....for the model number.....

Pursuant to the provisions of schedule for failure of model in check testing, were giving directions vide BEE letter number.....dated.... to take necessary corrective action. In the light of directive issued by the Bureau, we hereby declare that the following actions have been taken at our end.



| | Action Directed | Status | Action Taken |
|-------|--|-----------|---|
| (i) | Correct the star level displayed on the label of the Packaged Boiler to comply with the directions of the Bureau | Yes/No/NA | The star level has been corrected from.....star to.....star with effect from (Date) |
| (ii) | Withdraw all the stocks from the market to comply with the directions of the Bureau. and | Yes/No/NA | All the stocks from the market have been withdrawn to comply with the directions of the Bureau. |
| (iii) | Change the particulars displayed on advertising material. | Yes/No/NA | Yes/No/NA |

The above declaration is true to the best of our knowledge and belief.

Signature.....

Name.....

Designation.....

For and on behalf of.....

Name of the Company/Firm etc.

Seal of the Firm/Company