



MINUTES OF MEETING

Name of the Committee	Date & Time	Venue
Technical Committee Meeting for Room Air Conditioners	6-09-2016, 1430 hrs	Conference Hall, Bureau of Energy Efficiency

Agenda of the Meeting:

1. Finalization of Window AC star table for 2018
2. Inclusion default set temperature & auto clean option on the energy consumption standards
3. Combined Star Rating Table for fixed speed & inverter AC - 2018
4. Highlights of AC Merger Notification 2018

Initiating the discussion, Mr.Saurabh Diddi, Energy Economist, BEE welcomes all the technical committee members. Subsequently the agenda points were discussed.

Item 1: Finalization of Window AC star table for 2018

1. Following to the round of introduction by the members, BEE informed that it was decided in the last technical committee meeting that ISEER methodology to be followed for window air conditioner but revision of star rating plan was not discussed. In this regard, BEE proposed the following star rating table to be followed for window air conditioners, w.e.f January 2018.

Existing Table Validity: 1/1/2016 to 31/12/2017		
Star Rating	EER	EER
	Minimum	Maximum
1	2.5	2.69
2	2.7	2.89
3	2.9	3.09
4	3.1	3.29
5	3.3	

Proposed star rating plan Validity: 1/1/2018 to 31/12/2019		
Star Rating	ISEER	ISEER
	Minimum	Maximum
1	2.7	2.89
2	2.9	3.09
3	3.1	3.29
4	3.3	3.49
5	3.5	

The market scenario along with share of existing models in the market with respect to proposed star rating table was highlighted.

2. All the manufacturers mentioned said that share of window air conditioner market is reducing every year and upgrading the Window air conditioners will result in increase in development cost to achieve higher efficiency and will increase the cost for small market. Apart from market issues, there will be technical issues as well for the implementation of this table. Comments of technical committee members are as follows:
 - A. **Manufacture 1:** Technically, the air conditioner efficiency is highly governed by,
 - a) the size of heat exchanges (higher the size, more efficiency/EER)
 - b) efficiency of the compressor (higher efficiency, more EER)



- c) power consumed by compressor to deliver the required EER (lower power, higher EER)
- a) Size of Heat Exchangers
One way to increase the efficiency of the air conditioners is to increase the size of heat exchanger. Increasing heat exchanger size will further increase the height & depth of the window air conditioner and results in larger frame requirement. However, this will lead to increase in weight of the air conditioner & larger risk of fall after installation. Hence consumers may not appreciate increase in size.
- b) Efficiency of the compressor
Volume of the compressors can be optimized to achieve higher COP inline with the physical properties of the refrigerants used. However scope for optimization is limited and beyond the point, it delivers lesser cooling capacity.
- c) Motor power consumption
Increasing the RPM of the motor will also helps to increase the efficiency. However, AC motors will consume more power & creates noise. Therefore, with minimum power input, efficiency shall be achieved only upto certain point and beyond which power consumption will increase. The scope for designing Window AC with DC motor is limited although it can increase COP only upto 3.30. This is because that globally, such component suppliers are very rare.
- B. Manufacturer 2:** Apart from this technical constraint, more that 75% of market of Window AC lies in 2 & 3 star only and the percentage share of window AC, when compared to other category of ACs are actually decreasing.
- C. Manufacturer 3:** As on date only one 5 star model exists in the market according to proposed standards. Focus of all manufacturers are tuned towards achieving the 2018 standards for split air conditioners. In such scenario, stringency of standards of window AC will be difficult to achieve, since it needs more R&D and investment.
- D. Manufacturing Association:** BEE should consider the above technical & market constraints. Due to such limited global supply chain for components & limitations in designing, upgradation of efficiency of Window AC is not possible. It may also be noted that although market share of Star 2 & Star 3 is significant, there is nil market growth and in future the share of Window AC market will decrease. Therefore further tightening of standards will results in huge techno-economic investment and also effort of such huge capitalization for shrinking air conditioning market shall not suffice the objective of the program.

3. After a wide deliberation, it was decided that the existing table 2.5 shall be continued till 31st Dec,2019. However, it was also informed that the star rating parameter of Window AC shall be ISEER metric w.e.f 1st Jan,2018 and BEE shall continue to stop granting approvals for one star Window AC. In case, any manufacture initiate window air conditioner with variable speed compressor (Window Inverter AC), that will also be considered in the same table with inverter air conditioner testing methodology.

Star Rating Table followed for Window AC
Validity: 1st Jan,2018 to 31st Dec 2019

Star level	ISEER	
	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	

Item 2: Inclusion default set temperature & auto clean option on the energy consumption standards

4. With reference to the recommendations for energy conservation, received from various intuitions and consumer organizations for regularizing the default set temperature and auto filter clean option in ACs, BEE has proposed the following options:
 - a. The default set temperature of all air conditioners while switching ON shall be 27°C (ie., the inline with the testing temperature defined in IS 1391)
 - b. Provision for auto filter clean option or option to intimate the user regarding the accumulation of dust.
5. Manufacturers mentioned that the ACs will automatically detect the pre-set temperature while switching ON. If the ACs are programmed for default set temperature while switching ON, it will lead to discomfort to the user as in case of power failure as it will restart at 27°C instead of set point preferred by the consumer. However, keeping in view to conserve energy & for consumer comfort, it was suggested to add a note in this regard on the product user manual which will state that “comfort zone for humans is 24-27°C, hence to conserve electricity and for comfort conditioning, air conditioner should be used between 24-27°C”.
6. Manufacturers highlighted that provision auto filter clean option/auto removal of dust is technically difficult. However it was mentioned that option to intimate the user regarding the accumulation of dust & filter cleaning could be further investigated and the same will be discussed among the manufacturers.



Item 3: Combined Star Rating Table for fixed speed & inverter AC - 2018

7. Subsequently the market scenario of the fixed speed & Inverter ACs with respect to the 2018 combined star rating table was discussed. BEE highlighted that around 1300 models are complying as per 2018 star rating plan and out of which 12% is of Inverter AC’s market.

Item 4: Highlights of AC Merger Notification 2018

8. Subsequently, BEE have mentioned the following highlights of Air Conditioner Merger Notification that will be effective from 2018.

- Applicable for following types of air conditioners
 - Unitary (Window) AC
 - Split (Wall mounted, Ceiling mounted, Cassette, Floor Standing)
- Applicable for both fixed speed & variable speed air conditioners with or without heat pump.
- Follow IS 1391 & ISO 16358 with Indian specific bin temperature & bin hours as defined by BEE.
- Window AC (Fixed Speed & Variable Speed) shall follow the existing table with ISEER methodology. ie.,

ISEER		
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	

- All type of Split AC (Fixed Speed & Variable Speed) mentioned above shall follow the following table:

Star Level	Min ISEER	Max ISEER
Star 1	3.10	3.29
Star 2	3.30	3.49
Star 3	3.50	3.99
Star 4	4.00	4.49
Star 5	4.50	

The meeting concluded with vote of thanks.

Annexure Technical Committee Members			
S.No.	Name	Designation	Organization
1	Mr.Saurabh Diddi	Energy Economist	BEE
2	Ms.Deepshika Wadwa	Project Engineer	BEE
3	Mr.Manjeet Singh	Project Engineer	BEE
4	Ms.Meenakshi	Project Engineer	BEE
5	Mr.Sumit Solanki	Project Engineer	BEE
6	Mr.R.K. Mehta	Secretary	RAMA
7	Mr.J.M. Bhambure	V.P. R&D and Technology	Blue Star
8	Mr.Gurmeet Singh	Executive Director	RAMA/ Hitachi
9	Mr.Krishan Sachdev	Managing Director	Carrier Midea India
10	Mr.A.A. Acharekar	Associate G.M. (R&D)	Godrej & Boyce Co. Ltd.
11	Mr.Sanjeet Kumar	GM - R&D	Amber Enterprises
12	Mr.Sanjay Arora	COO	Amber Enterprises
13	Mr.M.K. Sharma	G.M.	Voltas Ltd.
14	Mr.Deba Ghoshal	V.P.	Voltas Ltd.
15	Mr.Neeraj Gupta	General Manager	Mitsubishi Electric
16	Mr.Shigeaki Okra	Asst. Manager	Mitsubishi Electric
17	Mr.Amit Ahuja	Add. G.M. Sales	ETA General Pvt. Ltd.
18	Mr.Balvinder Arora	Business & Operation Head	Intertek India
19	Mr.C.M. Pathak	Tech. Manager	Intertek India
20	Mr.Pankaj Chawla	AGM	Panasonic India
21	Mr.Smruti Ranjan Sahoo	Dy. Manager	Panasonic India
23	Mr.P.K. Mukherjee	Sr. Advisor	CLASP
24	Mr.Tanmay Tathagat	Director	EDS
25	Mr.Daljit Singh	Director	Amber Enterprises
26	Mr.Ritesh Singh	Sr. Manager	Voltas Ltd.
27	Mr.Kunal Nijhawan	Prod. Mgr.	Mitsubishi Electric
28	Mr.Rajneesh Kr. Pathak	D.M.	ETA General Pvt. Ltd.
29	Mr.Gujjala.B. Balaraju	Joint Director	CPRI Bangalore
30	Mr.S.Sundaramoorthy	Program Associate	CLASP