

BUREAU OF INDIAN STANDARDS

MINUTES

Panel for Air Conditioning, Heating and Mechanical Ventilation, CED 46:P14 : **Ninth Meeting**

Tuesday, 05 November 2024 : **1030 h – 1300 h**

Convener: Shri Ashish Rakheja **NBC Officer:** Shri Abhishek Sharma
Head (NBC Cell): Shri Arunkumar S

PRESENT

Members (Physically attended):

- 1) Shri Ashish Rakheja, Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi
- 2) Shri Prabhat Goel, In Personal Capacity, Gurugram
- 3) Shri Anil Chopra, Camfil India Private Limited, Gurugram

Members (Virtually attended):

- 1) Shri Sushil K. Choudhury, Blowtech Air Devices Private Limited, Noida
- 2) Shri Ankit Jain, Caire Consult, Noida
- 3) Dr Rajan Rawal, CEPT University, Ahmedabad
- 4) Shri Yash Shukla, CEPT University, Ahmedabad
- 5) Shri Yogesh Malhotra, Comfort Care System Private Limited, New Delhi
- 6) Dr Chandan Swaroop Meena, CSIR - Central Building Research Institute, Roorkee
- 7) Shri Gaurav Mehtani, Daikin Air Conditioning India Private Limited, Gurugram
- 8) Shri Rohit Thakur, Rep. Daikin Air Conditioning India Private Limited, Gurugram
- 9) Shri Goutham Pitchikala, ESKAYEM Consultants Private Limited, Mumbai
- 10) Smt Nivedita Jadhav, Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi
- 11) Shri K. Ramachandran, Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi
- 12) Shri Subbu, Rep. Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi
- 13) Shri Richie Mittal, International Ground Source Heat Pump Association, New Delhi
- 14) Dr R. S. Agarwal, In Personal Capacity, New Delhi
- 15) Shri Madhusudhan Rapole, International Ground Source Heat Pump Association, New Delhi
- 16) Dr Jyotirmay Mathur, Malaviya National Institute of Technology, Jaipur

- 17) Shri Ram Kumar Param, Military Engineer Services, New Delhi
- 18) Shri Sandeep Goel, Proion Consultants, New Delhi
- 19) Smt V. Manjunath, UL India Private Limited, Bengaluru

Invitees (Physically attended):

- 1) Shri K. D. Singh, Aircon Engineers Private Limited, New Delhi
- 2) Shri Aneesh Kadyan, CBRE South Asia Private Limited, Gurugram
- 3) Shri M. Selvarasu, LEAD Consultancy & Engineering Services (India) Private Limited, Bengaluru
- 4) Shri Vikram Murthy, Univac Environment Systems Pvt Ltd, Mumbai

Invitees (Virtually attended):

- 1) Shri Harshal Surange, ACR Project Consultants Private Limited, Pune
- 2) Shri Ajey Joshi, AECOM Indian Private Limited, Mumbai
- 3) Shri R. Saravanan, Anna University, Chennai
- 4) Shri Nishant Gupta, Degree Day Private Limited, Indore
- 5) Shri Krishnan Viswanath, Dynacraft Air Controls, Dadra
- 6) Ms Sangita Jhangiani, ENOVA, Mumbai
- 7) Smt Samta Bajaj, Envirocon Engineering Services, New Delhi
- 8) Shri Mukesh Suthar, Godrej & Boyce Mfg Co Ltd, Mumbai
- 9) Shri Chandrasekar Narayanan, Genex Consultants, Hyderabad
- 10) Shri Avinash Shaligram, In Personal Capacity, Bombay
- 11) Shri Shankar Rajasekaran, Impec Filters Private Limited, Chennai
- 12) Shri Amit Paigude, K Flex India Private Limited, Pune
- 13) Shri Varun Swarup, Paharpur Cooling Towers Limited, Ghaziabad
- 14) Shri Satish Kumar Dudeja, Trufrost & Butler, Gurugram
- 15) Dr Nitin Deodhar, Vision Electro Mechanical Consultants Private Limited, Pune
- 16) Shri Vikas Mehta, The Chemours India Private Limited, Gurgaon

From BIS:

- 1) Ms Khushbu Jyotsna Kindo, Scientist 'C' (Mechanical Engg)

Item 0 OPENING REMARKS

The Convener, Shri Ashish Rakheja heartily welcomed all the members to this ninth meeting of the Panel for Air Conditioning, Heating and Mechanical Ventilation, CED 46:P14. Shri Ashish Rakheja appreciated all the Panel members for their remarkable work and efforts in preparation of the preliminary draft of revision of this Part 8/ Section 3 chapter of NBC. He mentioned that given the short period of time given to the members, meticulous work has been done to bring the latest developments and requirements in the field for the revision of this chapter. He also mentioned that the main agenda for this meeting is to review the proposed preliminary draft (P-draft) discuss and approve the same for circulation to the National Building Code Sectional Committee, CED 46 and all its 22 Panels for their comments, so as to ensure coherence among various chapters of the NBC. Shri Rakheja informed the Panel that the detailed content list of the proposed preliminary draft has been circulated separately for members to review and share their inputs, if any.

With these remarks and after a formal introduction of the members present, the Convener suggested to take up the Agenda item-wise.

Item 1 CONFIRMATION OF MINUTES OF THE LAST MEETING

1.1 There being no comments on the Minutes of the eighth meeting of the Panel held on 30 July 2024 in New Delhi were circulated vide BIS DG letter No. CED 46:P14/A-2.8 dated 17 August 2024, the Panel confirmed the same, as circulated.

Item 2 COMPOSITION

2.1 The Panel noted the present composition of the Panel for Air Conditioning, Heating, and Mechanical Ventilation, CED 46:P14, as given at Annex 1 of the Agenda.

2.2 The Panel noted that some of the members/invitees attending this meeting shared their interest in being part of the revision of this Chapter and thus, the Panel decided co-opt the following members on the working group [core committee of Refrigeration and Air-Conditioning (RAC)]:

- 1) Shri K. D Singh from AIRCON Engineers (P) Ltd., New Delhi
- 2) Shri Aneesh Kadyan, CBRE South Asia Private Limited, Gurgaon
- 3) Dr. Nitin Deodhar, Vision Electro Mechanical Consultants Private Limited, Pune

2.3 Members of the Panel and the Core Groups including Chairs/Co-Chairs (listed in **Annex 1 (P-6)**) were requested to log-in to the BIS' Connect Portal and familiarize themselves with the new system for standards formulation established by BIS.

Item 3 PROJECT OF REVISION OF NBC

3.1 The Panel noted the details of the project of Revision of NBC and the contents in terms of various proposed Parts and Sections being brought out in the revised NBC as given at Annex 2 of the Agenda.

3.2 The Panel noted that the proposed preliminary draft, has been received in BIS after review by the Convener, the contributions from all subgroups (Chairs/Co-Chairs) and a thorough review by Dr Jyotirmay Mathur and Shri Manjunath. The Panel also noted the contents (listing the items) of the proposed P-draft of Part 8 'Building Services' / Section 3 'Air Conditioning, Heating, and Mechanical Ventilation' as given in Annex 3 of the Agenda. Members of the Panel were earlier provided with detailed contents listing both the items and the clauses of the proposed P-draft.

3.3 The Panel and the invitees considered and discussed the proposed Preliminary draft (P-draft). During the discussions, the participants shared their suggestions, and the following points were decided to be integrated/ modified in the draft before circulating the same formally as a preliminary draft:

- a) To add pictorial representation or graphic images in the draft by the Working Group Chairs/Co-Chairs that describe the application aspects of each of their sections.

- b) To rename Clause 8.1 'Chilled Beams' to 'Thermal Beams'.
- c) The Chairs/Co-Chairs were requested to inform to BIS regarding reference credit for the tables and figures added from other sources in this section of Air Conditioning, Heating and Mechanical Ventilation.
- d) The Chairs/Co-Chairs were requested to inform to BIS regarding if any formal permission is needed from external agencies for standards mentioned in the draft document.
- e) The Panel requested members to review the Terminology clause reference Indian Standards and the terminologies included in this chapter for harmonization between Indian Standards and NBC and prevent discrepancy.
- f) Respective Chairs/Co-Chairs to co-ordinate with/examine the Preliminary draft of Part 12 'Asset and Facility Management' regarding Building Management System (BMS).
- g) Respective Chairs/Co-Chairs to co-ordinate with/examine the Preliminary draft of Part 8 / Section 1 'Lighting and Ventilation' regarding Mixed Mode Ventilation.
- h) Respective Chairs/Co-Chairs to co-ordinate with/examine the Preliminary draft of Part 6 Section 1 'Loads, Forces and Effects' regarding the water tightness of building.
- i) To review and homogenize the zoning and ventilation with Part 4 'Fire and Life Safety' of NBC.
- j) To make the provision for the basement ventilation calculation and CFD analysis mandatory for multiple basements, particularly in the case of fire in basements, in which the boundary conditions of analysis will change with the operation of fire sprinklers.
- k) The Panel requested Shri K Ramachandran to communicate with the leadership of ISRAE regarding the use of specific provisions of the publication '*Indoor Environmental Quality Standard – ISHRAE Standard - 10001*'.
- l) The Panel requested Shri Ajey Joshi to share comments/suggestions on data centres part of this chapter.
- m) Shri Anil Chopra from Camfil India Pvt. Ltd., Gurugram kindly volunteered to update the 'MERV' mentioned in Table for 'Guidelines for Filter Efficiency Requirement in Health Care Facilities' as per the relevant Indian Standards in coordination with Shri Chandrasekar Narayanan.
- n) The Panel members noted that **IS 18794:2024** 'Air Handling Units – Specification' and **IS 18728:2024** 'Multiple split-system air conditioners and air-to-air heat pumps (VRF air conditioners) – Specification' have now been published through MED 03.

- o) Shri Radhey Agrawal kindly volunteered to share a flow chart mentioning the updated changes as per the MoEFCC phase down and phase out refrigerants.

All the Chairs/Co-Chairs were requested to send (within 07 days) their final inputs based on the detailed discussions during the meeting and provide their inputs in track change mode.

Based on the above, BIS was authorized to issue the Preliminary Draft of revision of this chapter, Part 8 / Section 3 'Air-conditioning, Heating and Mechanical Ventilation' for a period of 3 weeks.

3.4 The Panel noted that the Preliminary Drafts from various other panels of the National Building Code Sectional Committee (covering other chapters of NBC) have already been circulated. All the members of this Panel (including the Core Groups) were requested to share their comments/suggestions on these drafts through the designated portal OR by email. Further, since most Parts/Sections of NBC are cross-referred in other chapters, members were urged to peruse all the preliminary drafts, particularly their scope and foreword that lists the proposed changes in the respective chapters.

The Member Secretary of the National Building Code Sectional Committee, CED 46, Shri Arunkumar S. briefly informed the process for the drafts prepared by Panels under this Committee for the knowledge of everyone present.

Item 4 DATE AND PLACE OF NEXT MEETING

The Panel decided to hold the next meeting of the Panel around **mid-December** to consider the comments received on the P-Draft to approve it for issuing in Wide Circulation.

Item 5 ANY OTHER BUSINESS

BIS thanked the Convener, Shri Ashish Rakheja for his guidance and ably conducting the meeting. Also, BIS thanked all members and participants for their valuable inputs and suggestions during the meeting.

Annex 1
(Item 2.3)

COMPOSITION OF THE PANEL, P14 *(as in the BIS' Connect Portal)*

S.No.	Organization	Member Name
1	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Shri Ashish Rakheja
2	Aeon Integrated Building Design Consultants, Noida	Shri Anurag Joshi
3	Aeon Integrated Building Design Consultants, Noida	Shri Saurabh Goyal
4	Ashrae India Chapter, New Delhi	Shri Priyank S. Garg
5	Ashrae India Chapter, New Delhi	Shri Indrajit Bhattacharya
6	Blowtech Air Devices Private Limited, Noida	Shri Sushil K. Choudhury
7	Blue Star Limited, Mumbai	Shri B. Thiagarajan
8	Blue Star Limited, Mumbai	Shri Srinivas Reddy
9	Bureau of Energy Efficiency, New Delhi	Shri Saurabh Diddi
10	Bureau of Energy Efficiency, New Delhi	Ms Meenal Anand
11	Bureau of Energy Efficiency, New Delhi	Shri Jotham Prabhu
12	CEPT University, Ahmedabad	Shri Rajan Rawal
13	CEPT University, Ahmedabad	Shri Yash Shukla
14	CSIR - Central Building Research Institute, Roorkee	Shri Tabish Alam
15	CSIR - Central Building Research Institute, Roorkee	Dr Shorab Jain
16	CSIR - Central Building Research Institute, Roorkee	Shri Chandan Swaroop Meena
17	Caire Consult, Noida	Shri Ankit Jain
18	Camfil India Private Limited, Gurgaon	Shri Anil Chopra
19	Carrier Air Conditioning and Refrigeration Limited, Gurugram	Shri Bimal Tandon
20	Central Public Works Department, New Delhi	Shri Vikas Rana
21	Central Public Works Department, New Delhi	Shri Ramayan Prasad Gupta
22	Climaveneta Climate Technologies Private Limited, Bengaluru	Shri Anil Dev
23	Climaveneta Climate Technologies Private Limited, Bengaluru	Shri Nanthagopalan TK.
24	Climaveneta Climate Technologies Private Limited, Bengaluru	Shri Akshay Dev
25	Comfort Care System Private Limited, New Delhi	Shri Yogesh Malhotra
26	Daikin Air Conditioning India Private Limited, Gurugram	Shri Kanwaljeet Jawa
27	Daikin Air Conditioning India Private Limited, Gurugram	Shri Sanjay Goyal
28	Daikin Air Conditioning India Private Limited, Gurugram	Shri Gaurav Mehtani
29	Delhi Metro Rail Corporation Limited, Delhi	Shri Ashok Tewari

30	Delhi Metro Rail Corporation Limited, Delhi	Shri Rajesh Jain
31	Department of Delhi Fire Services, Govt of NCT of Delhi, Delhi	Shri Atul Garg
32	Department of Delhi Fire Services, Govt of NCT of Delhi, Delhi	Shri Mukesh Verma
33	ESKAYEM Consultants Private Limited, Mumbai	Shri Goutham Pitchikala
34	Indian Green Building Company Council, Hyderabad	Shri Praveen Kumar Soma
35	Indian Institute of Technology Delhi, New Delhi	Shri Mukesh Khare
36	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Shri K. Ramachandran
37	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Smt Nivedita Jadhav
38	International Ground Source Heat Pump Association, New Delhi	Shri Richie Mittal
39	International Ground Source Heat Pump Association, New Delhi	Shri Madhusudan Rapole
40	Kanwal Industries Corporation, Noida	Shri Pawandeep Singh
41	Kanwal Industries Corporation, Noida	Shri Jaiveer Singh
42	Kirloskar Chillers Private Limited, Pune	Shri Avinash Manjul
43	Kirloskar Chillers Private Limited, Pune	Shri Gaurang Dabholkar
44	Kirloskar Chillers Private Limited, Pune	Shri Amey Majgaonkar
45	Malaviya National Institute of Technology, Jaipur	Dr Jyotirmay Mathur
46	Military Engineer Services, New Delhi	Shri Ram Kumar Param
47	Military Engineer Services, New Delhi	Shri Arvind Kumar
48	Proion Consultants, New Delhi	Shri Sandeep Goel
49	Schneider Electric India Private Limited, Gurugram	Shri Himanshu Nigam
50	Schneider Electric India Private Limited, Gurugram	Ms Devaki K. N.
51	Shinryo Suvridha Engineers India Private Limited, Noida	Shri Ashok K. Virmani
52	Shinryo Suvridha Engineers India Private Limited, Noida	Shri Sanjay Mookerjee
53	Sterling India, New Delhi	Shri G. C. Modgil
54	Sterling India, New Delhi	Ms. Khushboo Modgil
55	The Institution of Engineers (India), Kolkata	Shri Pradeep Chaturvedi
56	The Institution of Engineers (India), Kolkata	Shri Anirban Datta
57	UL India Private Limited, Bengaluru	Shri Satish Kumar
58	UL India Private Limited, Bengaluru	Shri V. Manjunath
59	UL India Private Limited, Bengaluru	Ms Pallavi Tripathi
60	Voltas Limited, Mumbai	Shri Ashwani Sharma
61	Voltas Limited, Mumbai	Shri Pankaj Goel
62	In Personal Capacity, New Delhi	Dr R. S. Agarwal
63	In Personal Capacity, Roorkee	Dr P. K. Bhargava
64	In Personal Capacity, Gurugram	Shri Prabhat Goel

COMPOSITION OF THE CORE GROUP INCLUDING THE VARIOUS CHAIRS/CO-CHAIRS OF P14 *(as in the BIS' Connect Portal)*

S.No.	Organization	Member Name
1	ACR Project Consultants Private Limited, Pune	Shri Harshal Surange
2	Adani Aerospace and Defence Limited, Bengaluru	Shri Pramod Prabhakar
3	AIRCON Engineers (P) Ltd., New Delhi	Shri K. D Singh
4	Anna University, Chennai	Dr R Saravanan
5	Blowtech Air Devices Private Limited, Noida	Shri Sushil K. Choudhury
6	Breathe Easy Labs, New Delhi	Shri Barun Agarwal
7	CBRE India, Gurugram	Shri Aneesh Kadyan
8	CEPT University, Ahmedabad	Shri Yash Shukla
9	Degree Day Private Limited, Madhya Pradesh	Shri Nishant Gupta
10	Dynacraft Air Controls, Mumbai	Shri V Krishnan
11	ELM Enterprises Private Limited, Delhi	Shri Prashant Desai
12	ENOVA, Mumbai	Ms Sangita Jhangiani
13	ESKAYEM Consultants Private Limited, Mumbai	Goutham Pitchikala
14	Envirocon Engineering Services, New Delhi	Smt Samta Bajaj
15	Genex Consultants, Hyderabad	Shri Chandrasekar Narayanan
16	Godrej & Boyce Manufacturing Company Limited, Mumbai	Shri Mukesh Suthar
17	Impec Filters Private Limited, Chennai	Shri Shankar Rajasekaran
18	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Shri Ashish Rakheja
19	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Shri K. Ramachandran
20	Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi	Smt Nivedita Jadhav
21	International Ground Source Heat Pump Association, New Delhi	Shri Madhusudan Rapole
22	Lead Consultancy and Engineering Services (India) Private Limited, Bengaluru	Shri M.Selavarasu
23	Malaviya National Institute of Technology, Jaipur	Jyotirmay Mathur
24	Overdrive Engineering Private Limited, New Delhi	Shri Richie Mittal
25	Paharpur Cooling Tower Limited, Kolkata	Shri Varun Swarup
26	Proion Consultants, New Delhi	Sandeep Goel
27	Reliance Industries Limited, Bengaluru	Shri Ajaj Kazi
28	SSS Placement Consultants & Event Management, New Delhi	Shri C.Subramaniam
29	Sanelac Consultants Private Limited, New Delhi	Shri Varun Jain
30	Sterling India, New Delhi	Shri G. C. Modgil
31	The Chemours India Private Limited, Gurugram	SH VIKAS MEHTA
32	UL India Private Limited, Bengaluru	Shri V. Manjunath
33	Univac Environment Systems Private Limited, Mumbai	Shri Vikram Murthy
34	Vision Electro Mechanical Consultants Private Limited, Pune	Dr. Nitin Deodhar

35	IN PERSONAL CAPACITY	Shri Avinash G. Shaligram
36	In Personal Capacity, Gurugram	Shri Prabhat Goel

PS: All members are encouraged to visit the BIS' Standardization Portal, <https://www.manakonline.in/MANAK/login>
Click **Standardization** Tile, then click **LOGIN**
and reset their password (using FORGOT PASSWORD) before accessing for the first time the interactive portal.

For queries towards login, contact BIS:

Shri Abhishek Sharma, C: 9557826696
Shri Arunkumar S, C: 9818955761
