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**MINUTES**

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| **MEETING** | **DAY & DATE** | **TIME** | **VENUE** |
| **Forty-second meeting of Refrigeration and Air Conditioning Sectional Committee, MED 03** | **Thursday**  **26 September 2024** | **1100 – 1530 HRS** | **Manak Bhavan, New Delhi** |

**CHAIRPERSON:** Prof (Dr) Ravi Kumar,Department of Mechanical & Industrial Engineering, Indian Institute of Technology (IIT), Roorkee, Uttarakhand.

**MEMBER SECRETARY**: Miss Neha Thakur, Scientist ‘C’/Deputy Director (MED), BIS, New Delhi.

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| **Sl No.** | **Organisation Name** | **Name of The Member** | **Email** | **Mobile** |
|  | Indian Institute of Technology Roorkee, Roorkee | Prof Ravi Kumar (*Chairperson*) | ravi@me.iitr.ac.in | 9458158967 |
|  | BSH Household Appliances Manufacturing Private Limited, Chennai | Shri Loganathan Vijay Kumar | vijay.loganathan@bshg.com | 9942843303 |
|  | Blue Star Limited, Mumbai | Shri Sunil Kumar Jain | suniljain@bluestarindia.com | 9930966872 |
|  | Bureau of Energy Efficiency, New Delhi | Shri Dheeraj Pandey | Dheeraj.pandey96@beeindia.gov.in | 8700653055 |
|  | CEPT University, Ahmedabad | Shri Yash Shukla | yash.shukla@cept.ac.in | 9913318333 |
|  | Carrier Air Conditioning and Refrigeration Limited, Gurugram | Shri Munish Kumar Sharma | indiaengineering@carrier.com | 9873244099 |
|  | Copeland India Private Limited, Pune | Shri S. Chethan Tholpady | chetan.tholpady@copeland.com | 9850602426 |
|  | Daikin Air Conditioning India Private Limited, Gurugram | Shri Yogesh Kumar | Yogesh.kumar@daikinindia.com | 8003240555 |
|  | Electrical Research and Development Association, Vadodara | Shri Rakesh Patel | rakesh.patel@erda.org | 9512036788 |
|  | Godrej & Boyce Manufacturing Company Limited, Mumbai | Shri Jasvir Singh | jasvirs@godrej.com | 9923108220 |
|  | Honeywell International India Private Limited, Gurugram | Shri Avinash Kumar | avinash.kumar2@honeywell.com | 9911011706 |
|  | Indian Society of Heating, Refrigerating and Air Conditioning Engineers, New Delhi/ Malaviya National Institute of Technology Jaipur | Dr Jyotirmay Mathur | jmathur.mech@mnit.ac.in | 9414250329 |
|  | International Copper Association India, Mumbai | Shri Shankar Sapaliga | shankar.sapaliga@internationalcopper.org | 9769036943 |
|  | Intertek India Private Limited, Gurugram | Shri C. M. Pathak | pathakcm1@hotmail.com | 9818462001 |
|  | Johnson Controls-Hitachi Air Conditioning India Limited, Mehsana | Shri Rahul Ramtekkar | rahul.ramtekkar@jci-hitachi.com | 9833846640 |
|  | Johnson Controls-Hitachi Air Conditioning India Limited, Mehsana | Shri Heena Ramsinghani | heena.ramsinghani@jci-hitachi.com | 6355254231 |
|  | Refrigeration and Air Conditioning Manufacturers Association, New Delhi | Shri Harsh Vardhan Pant | secretary@rama-india.org | 8826997711 |
|  | Samsung India Electronics Private Limited, New Delhi | Shri Kalicharan Sahu | k.sahu@samsung.com | 9811315907 |
|  | Samsung India Electronics Private Limited, New Delhi | Shri Amit Kumar Jha | jha.amit@samsung.com | 8800967800 |
|  | Sierra Aircon Private Limited, Gurugram | Shri Vikas Kumar Sharma | mail@sierraaircon.com | 9813488694 |
|  | The Chemours India Private Limited, Gurugram | Shri Tushar Aggarwal | tushar.aggarwal@chemours.com | 9818900513 |
|  | The Chemours India Private Limited, Gurugram | Shri Vikas Mehta | vikas.mehta@chemours.com | 9910112192 |
|  | Trane Technologies India Private Limited, Bengaluru | Shri Vivek Kumar | Kumar.v@trane.com | 9910371058 |
|  | UL India Private Limited, Bengaluru | Shri V. Manjunath | manjunath.v@ul.org | 9902088120 |
|  | UL India Private Limited, Bengaluru | Shri Satish Kumar | satish.kumar@ul.org | 8130427334 |
|  | Voltas Limited, Mumbai | Shri Srinivasu Moturi | vasu@voltas.com | 9899872440 |
|  | Voluntary Organisation in Interest of Consumer Education (VOICE), New Delhi | Shri H. S. Wadhwa | hswadhwa@gmail.com | 9873478225 |
|  | In Personal Capacity | Shri P K Mukherjee | pkmukherjee09@yahoo.com | 9910013204 |

**BIS Directorate:**

1. Shri K. V. Rao, Sc.F/Senior Director and HMED
2. Ms Neha Thakur, Sc.C/ Deputy Director, MED

**Item 0 WELCOME AND OPENING REMARKS**

* 1. Shri K V Rao, Head (MED) welcomed the Chairperson and all the members present during the meeting. He apprised the members of the one of the important discussion of this meeting i.e. sustainability. He said that circular economy WG under this Committee may be transformed to panel so that this panel will deliberate and provide recommendation for formulation of horizontal standard on sustainability, first for Room ACs and Portable ACs. The Committee agreed to this proposal.

He further thanked the members for their valuable inputs, making this Committee very dynamic in nature in terms of formulating Standards and participation by members in Panel and WGs. He informed that this Committee has more manufacturers. However, the

The composition may be balanced by bringing members from Academia and R&D institutions. With this, he hoped for fruitful deliberation during the meeting.

* 1. Prof Ravi Kumar, Chairperson MED 03 welcomed all the members present during the meeting. He appreciated the work done by the members and their active participation in the panels and WGs. He reminded the Committee of the appreciation received by this Committee as the best Committee two years back for its outstanding work. He requested the member for their continued and effective participation in this Committee. With this, he hoped for fruitful deliberation during the meeting.

**Item 1 CONFIRMATION OF THE MINUTES OF THE LAST MEETING**

The Committee confirmed the minutes of 41st meeting of Refrigeration and Air Conditioning Sectional Committee, MED 03 held on 24 June 2024 through VC (WEBEX) which was circulated vide email bearing reference MED 03/A-2.41 dated 03 July 2024.

**Item 2 SCOPE AND COMPOSITION OF COMMITTEE**

**2.1 SCOPE**

The Committee noted the present scope and liaison with ISO and IEC Committees.

Shri P K Mukherjee commented on the revised draft scope. He commented to replace ‘Circular economy and the end of the lifecycle of the product’ should be replaced with ‘sustainability’ considering the recommendations at Item 6, Sl no. 9. He also commented to replace ‘refrigerating’ with ‘refrigeration’ term in second para as refrigerating is a term used for both refrigeration and ACs. He also said to include cold-chain in second para.

MS also apprised the members that the scope may need to be revisited as new subject of standardization has been proposed by the panel ‘Safety pertaining to refilled AC gas’.

The Committee noted the following revised draft scope, the above comments and decided to revisit the scope in its next meeting.

*‘Standardization in the fields of refrigeration and air-conditioning, including terminology, mechanical and electrical safety, designation of refrigerants, methods of testing and rating equipment, measurement of sound levels, circular economy and the end of the lifecycle of the product, with consideration given to environmental protection*

*The scope also includes:*

* + *Refrigerating and similar appliances for household and commercial use;*
  + *Factory-assembled air-conditioners (cooling), heat pumps, dehumidifiers, and refrigerant reclaiming and recycling equipment as well as other devices, components and equipment such as humidifiers, ventilation equipment, line components, and refrigeration controls used in air-conditioning and refrigeration systems;*
  + *Automotive air conditioning; and*
  + *Selection, installation, commissioning and maintenance of HVAC System considering the conducive environment, safety, and human health.’*

**2.2 COMPOSITION OF THE SECTIONAL COMMITTEE AND ITS SUB-COMMITEES**

**2.2.1** The Committee reviewed the composition and the attendance. It noted the percentage of manufacturers which is 50% exceeding the limit of prescribed 33%. MS apprised the members of the Annual Review of Contribution by the Committee members and informed the members of next review which will be done in the next meeting of MED 03. MS requested members to go-through the guidelines at Annex-2 and Declaration at Item 2.2.2. The members who have no contribution/marginal contribution may be removed from MED 03 in its next meeting.

The Chairperson requested MS to recirculate the guidelines at Annex-2 and Declaration at Item 2.2.2 to the members.

MS also requested the members to physically present during the meeting when it is physical mode meeting only, from the next meeting onwards. Otherwise, the meeting attendance will be marked absent. MS also informed that only nominated members as per Annex-1 are entitled to attend the Sectional Committee meeting, except exigency cases.

The Committee also decided to send active participation letter to the organizations which have less than 50% attendance in past 4 meetings.

**2.2.2** The Committee noted the information.

**2.2.3** The Committee noted the information.

**2.2.4** The Committee noted the information.

**2.2.5** The Committee noted the information.

**2.2.6 Gender Responsive Standards Initiative**

The Committee noted the information.

**2.2.7 List of Technical Experts**

The Committee noted the information.

**2.2.8 Requests for Nomination to Committee/ Sub-Committee/ Panel/ Working group**

MED 03 reviewed the following co-option requests:

a) Shri Sajal Bhardwaj, HOD-R&D, Starion India Pvt Ltd, Greater Noida;

b) Shri Sumit Shivaji Umbarje, in personal capacity;

c) Shri Japneet Singh Juneja, Chief Technology Officer/Partner, Ace Test Labs;

d) Shri Shekh Tazimul Haque Faridi, Manager, Dyson Technology India Pvt Ltd, Gurugram, Haryana;

e) Shri Dalip Singh, in personal capacity;

f) Shri Kannan G R, Professor PSNA College of Engineering and Technology;

g) Shri Muralidharan K, Professor PSNA College of Engineering and Technology;

h) Shri Anbarasan B, Assistant Professor, PSNA College of Engineering and Technology;

j) Shri S Murugapoopathi, in personal capacity; and

k) Dr.-Ing. Jyotirmay Mathur, BIS Standards Chair Professor, Malaviya National Institute of Technology Jaipur

MED 03 accepted the co-option request of k) i.e. Dr.-Ing. Jyotirmay Mathur representing Malaviya National Institute of Technology, Jaipur. It further decided to seek area of interest from co-option requests of a) to j) by sending them the list of panels under MED 03 for their co-option in maximum two panels.

The Committee requested ISHRAE to provide its revised nomination in nomination proforma and declaration (*see* forms at ITEM 2.2.2).

**Item 3** **ANNUAL CALENDAR AND** **PROCESS OF STANDARDISATION**

1. The Committee modified the **Annual calendar** as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technical Committee** | **1st Quarter** | **2nd Quarter** | **3rd Quarter** | **4th Quarter** |
| **MED 03** | **24 Jun 2024** | **26 Sep 2024** | **XXa Nov 2024** | **06 Mar 2025** |

**a**Exact date will be decided in consultation with the Chairperson.

1. **Research & Development Projects**

The Committee noted the guidelines and approved following three projects under MED 03 for R&D project:

1. Study and Collection of Data for Bin temperature distribution and bin hours for heating though heat-pump - Dr Jyotirmay Mathur will prepare draft terms of reference (ToR)
2. Study and Collection of data for Smart refrigeration and Air-conditioning including DR (Disaster recovery) technologies - Shri P K Mukherjee will prepare draft ToR.
3. Study and collection of data to find out potential sources of leakage of refrigerant gases from ACs and their prevention methods - Shri Srinivasu Moturi in collaboration with Shri Shankar Sapaliga, will prepare draft ToR.

Committee decided that the above ToRs once received shall be circulated to MED 03 for its comments within 15 days. If no comment is received, the Committee approved the draft ToRs as final recommendation for R&D projects under MED 03.

The format for ToR is given at Annex-5.

BIS R&D Guidelines is attached here for reference.



1. The Committee noted the information.
2. The Committee noted the information
3. The Committee noted the information.
4. The Committee noted the information.
5. The Committee noted the information.

**Item 4 ACTION ARISING OUT OF THE PREVIOUS MEETING(S)**

**4.1** The summary of actions taken on the minutes of the last meeting and present status are given below:

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| --- | --- | --- | --- | --- |
| **Sl No.** | **Item no.** | **Decision of 41st meeting** | **Present Status** | **Decision of 42nd meeting** |
|  | 4.1 (1) | **MED 03 (24952) Adjusted Volume Calculation For Refrigerating Appliances (Adoption of IEC TR 63061 ):**  The Committee finalized the draft for printing. | The standard has been published in September 2024 as IS 18846 : 2024/ IEC TR 63061:2017 ‘Adjusted Volume Calculation for Refrigerating Appliances’.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (13) | **MED 03 (22144) : Refrigerating systems and heat pumps Competence of personnel (Adoption of ISO 22712: 2023)**  The Committee finalized the draft for printing. | The standard has been published in September 2024 as IS 18847 : 2024/ ISO 22712: 2023 ‘Refrigerating systems and heat pumps Competence of personnel’.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (18) | **MED 03 (19119) Non-Ducted Portable Air-Cooled Air Conditioners And Air-to-Air Heat Pumps Having A Single Exhaust Duct Testing And Rating For Performance (MOD Adoption of ISO 18326: 2018)**  The Committee noted the information and requested MS to share the prepared draft for review by the Committee for editorial corrections. | The standard has been published in September 2024 as IS 18848 : 2024 ‘Non-Ducted Portable Air-Cooled Air Conditioners and Air-to-Air Heat Pumps having a Single Exhaust Duct - Testing and Rating for Performance’.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (14) | **MED 03 (19768) Finned type heat exchanger for room air conditioner (First Revision) Amendment – 3**  Shri P K Mukherjee suggested the panel to give ‘alloy composition number’ in Table-3 and Table-4 inline with terminology used in market. He also suggested to contact MTD to identify the alloy composition number.  The Committee requested the panel to expedite and dispose of the comments of CMD-3.  The Committee approved the recommendations received from the panel, for incorporation in the draft and submission to CMD-3. | The panel disposed of the comments of CMD-3 in its 18th meeting which was held on 27 June 2024. The MoM is attached here.    Accordingly, the modified draft amendment no.3 was then sent for printing with the approval of Chairperson.  The amendment no. 3 to IS 11329:2018 has been published in August 2024.  The Committee may **NOTE**. | The Committee noted the information and approved the recommendation of the panel. |
|  | 4.1 (15) | **MED 03 (22200) Drinking Water Coolers ― Specification [ First revision of IS 1475 (Part 1)]**  The Committee reviewed the recommendation and decided to include performance requirements for coolers with cooling capacity ratings other than those given in Table 1, later through amendment no. 1 to IS 1475:2024.  The Committee requested Shri Srinivasu Moturi of Voltas to expedite and provide draft as per the recommendations of the panel and above. The above draft, minutes of 7th & 8th meeting of panel, will be submitted to CMD-3 for its clarification.  The above draft will be sent for printing. | The modified draft as per panel recommendations, had been received from Shri Srinivasu Moturi on 09 July 2024. Accordingly, the modified draft standard was then sent for printing with the approval of Chairperson.  The revised standard has been published in August 2024 as IS 1475:2024 ‘Drinking Water Coolers - Specification (Fourth Revision)’.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (19) | **MED/03/22387/ IS 3315 Direct Evaporative Air Cooler - Specification (Fourth Revision)**  The Committee requested the panel to expedite and dispose of the comments of CMD-3.  The Committee approved the recommendations received from the panel, for incorporation in the draft and submission to CMD-3.  The above draft will be sent for printing. | The panel disposed of the comments of CMD-3 in its 19th and 20th meeting which were held on 01 July and 15 July 2024. The MoM are attached here.    Accordingly, the modified revised draft was then sent for printing with the approval of Chairperson.  The revised standard has been published in August 2024 as IS 3315 : 2024 ‘Direct Evaporative Air Cooler ― Specification (Fourth Revision)’.  The Committee may **NOTE**. | The Committee noted the information and approved the recommendation of the panel. **See also Item 5.7**. |
| 1. 2 | 4.1 (2) | **Amendment no. 1 to IS 17773 : 2022 Closed-Circuit Ammonia**  **Refrigeration System — Code of Practice for Design and Installation (ANSI/IIAR 2 : 2014, NEQ)**    The Committee approved the recommendation of the panel and requested MS to prepare the draft amendment no.1 to IS 17773 : 2022 as per the recommendation of the panel.  The Committee decided to wide circulate the above draft amendment for one month. If no comment is received on the wide circulated draft, the Committee approved the draft for printing. | The last date for comments is 19 October 2024.  The Committee may **NOTE**. | The Committee noted the last date of comments. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel. |
|  | 4.1 (4) | **IS 2167 (ISO 22044 : 2021, MOD) Commercial Beverage Coolers (fourth revision)**  The Committee requested MS to provide update in the next meeting. | The third revision of IS 2167 has been published in July 2024.  The revised draft standard has been put for Wide Circulation. The last date for comments is 20 November 2024.  The Committee may **NOTE**. | The Committee noted the information and the last date of comments. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel. |
|  | 4.1 (10) | **ISO 16890-2:2022 ‘Air filters for general ventilation — Part 2: Measurement of fractional efficiency and air flow resistance’**  The Committee approved the draft which is identical adoption of ISO 16890-2:2022, for wide circulation for one month time. If no comment is received on the wide circulated draft, the Committee approved the draft for printing. | Last date for comments is 19 October 2024.  The Committee may **NOTE.** | The Committee noted the last date of comments. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel. |
| 1. 3 | 4.1 (3) | **MED 03 (19252)/ IS 1474:1959 Commercial Refrigerators (ISO 23953-2 : 2015, MOD)**  Shri P K Mukherjee and Shri V Manjunath informed that the comments are of editorial nature.  So, the Committee requested Shri Satish Kumar to review the above comments and provide the revised draft within one week. The revised draft so received, will be sent for printing.  **Background**  MED 03 (19252) ‘Refrigerated display cabinets Part 2 Classification requirements and test conditions’ document was finalized during 37th meeting. The draft is under preparation as per Panel & Committee recommendation for printing.  The final draft (19252) was circulated to the Panel and comment has been received from Shri Vishal Nichite of M/s Western Refrigeration Private Limited on 30th March 2023.    The Committee decided that the comments of M/s Western Refrigeration Private Limited will be taken in the amendment and decided to send the final draft for printing. | The revised draft had been received from Shri Satish Kumar dated 05 August 2024. Accordingly, the draft has been sent for printing on 06 August 2024.  The Committee may **NOTE**. | The Committee noted the information. |
| 1. 4 | 4.1 (8) | **IS 3615 Glossary of terms used in refrigeration and air conditioning**  The Committee finalized the draft for printing. | The draft is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (11) | **MED 03 (25074)/ ISO 16890-4:2022 Air filters for general ventilation — Part 4: Conditioning method**  The Committee finalized the draft for printing. | The draft is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | 4.1 (12) | **MED 03 (22778) Electronic Expansion Valve — Specification**  The Committee decided that if no comment is received on the wide circulated draft, the Committee approved the draft for printing. | The draft is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
| 1. 5 | 4.1 (5) | i) **IS/IEC 60335-2-40: 2018 Household and similar electrical appliances – Safety : Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers**  The Committee requested Shri V. Manjunath, Shri Satish Kumar and Shri Vikas Mehta to expedite and provide the draft National deviation to IEC 60335-2-40: 2022 keeping in view of cases of mixing of AC gas, marking and constructional requirements. Shri V. Manjunath agreed to provide the draft by 01 July 2024.  The above draft, will be put up for wide circulation for two month time. If no comment is received on the wide circulated draft, the Committee approved the draft for printing.  MS apprised the members of the wide circulated draft on CHD 06 (25181) Refrigerant Gases – Specification ( Third Revision ), prepared by CHD06. Members were requested to provide comments on the draft through email within one week time to CHD.  **Background**  Committee approved to wide circulate the draft received from the panel for one month time.  The Committee also agreed that once the standard is published the same will be referred to in IS 1391 (Part 1) and (Part 2). | The Draft National deviation to IEC 60335-2-40: 2022 is awaited from the panel.  The Convener of the panel may **UPDATE**. | Shri Satish Kumar and Shri V Manjunath informed that the working draft is almost ready and few clauses are being reviewed by them to avoid ambiguity. The Committee requested them to expedite and they also agreed to provide the final working draft. The Committee approved the draft so received for wide circulation for two months time. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel. |
|  | 4.1 (7) | **Selection, operation and maintenance of room AC – Code of Practice**    Shri Shankar apprised the members of the progress on the draft. He informed that Part 1 which is for residential ACs is almost ready and will be finalized in the next panel meeting.  The Committee requested the panel to provide update in the next meeting, | 6th meeting of Panel was held on 16 September 2024. The MoM is attached here.    The Committee may **CONSIDER** and **DECIDE**. | Shri Shankar Sapaliga briefed the discussions and recommendations of the panel during its 6th meeting. The Committee approved the recommendation of the panel.  Shri P K Mukherjee informed the panel that IS 10596 (Part 1 to 4):1983 under MED 20, may be referred for the structure of the working draft.  The Committee requested the panel to provide update in the next meeting. |
| 1. 6 | 4.1 (6) | **ISO/ TC 86/ SC6/ WG15 Advanced performance standards :**  **Testing and calculating methods for seasonal performance factors of air-cooled air conditioners and air-to-air heat pumps: Part 1 Cooling seasonal performance factor**  Experts informed that no meeting of WG15 has happened since the last meeting.  **Background**  The Committee decided to ‘Approve’ the ballot on document ISO/NP 21280 'Testing and rating including seasonal performance of air-to-air air-conditioners and heat pumps considering the effect of native control' and nominate Dr. Jyotirmay Mathur of ISHRAE, Shri V Manjunath, and Shri Srinivasu M of Voltas in the development of this project. It decided to give additional comments once the outline of the draft is more elaborate. | Experts may update on the meeting and draft document.  The Experts may **UPDATE**. | Experts informed that there is no update. So, the Committee decided to drop this item now and may be discussed when there is an update, informed by the nominated experts. |
| 1. 9 | 4.1 (9) | **Panel on Compressors**  Regarding the Panel meeting held on 13th June 2023 it was informed that clarification was sought from CMD-III if a separate BIS certification would be required if IS/IEC 60335-2-34 is certified by IEC. CMD-III had clarified that separate licence would be required for IS/IEC 60335-2-34 for safety if performance and safety standards are separate.  The Committee noted the information and accepted the Panel recommendations based on meetings held on 18th April 2023, 9th May 2023, and 13th June 2023.  Further it added the following organizations in the working groups of the Panel:  WG2 (Special compressors):  f) Representative from M/s Danfoss  WG3 (Semi-hermetic compressor):   1. Shri Jeyaprakash Gurusamy of M/s Ingersol Rand (TRANE); 2. Representative from M/s Bitzer; 3. Representative from M/s Frascold; 4. Representative from M/s Danfoss; 5. Representative from M/s Copeland/Copland; 6. Shri P K Mukherjee in Personal Capacity; 7. Shri Manmohan K of M/s Carrier; 8. Representative from UL; and 9. Shri Srinivasu M of M/s Voltas. 10. Shri Shankar Sapaliga of ICA | Panel meetings were held on 18th April 2023, 9th May 2023, and 13th June 2023.    Minutes of 3rd Panel meeting is under preparation and will be circulated to the Panel for its confirmation and to the Committee.    The Committee may **NOTE**. | The Committee requested panel to provide its latest recommendation on compressors. |
| 1. 15 | 4.1 (16) | During the meeting, following observations were put up by the members:  a) Improper identification of refrigerants in cylinders. Only colour code is present and not refrigerant designation;  b) Unavailability of certified Technicians;  c) Licensing of refrigerant retailers in secondary market;  d) Manufacturers declare maximum operating temperature of ACs which is not specified in the standard for marking and labelling;  e) Refrigerant Leak Sensing method need to be identified; and  f) Notice on the RAC equipment advising consumers to ensure the refilling of same type of refrigerant as recommended by manufacturer.  The Committee formulated a panel to provide recommendation on the standards keeping in view of safety pertaining to refilled AC gas. | The 1st meeting of Panel was held on 17 September 2024. The MoM is attached here.    The Committee may **CONSIDER** and **DECIDE**. | The Committee noted the MoM of 1st meeting of the panel. The Committee approved the recommendation of the panel.  The Committee approved the new subject ‘Identification, Storage, Transportation and Handling of Refrigerants / Cylinders’ for standard formulation under MED 03.  The Committee also deliberated that the safety pertaining to refilled AC gas and during the refilling of AC gas, may be addressed in the upcoming draft standard which is being formulated under Selection, operation and Maintenance of HVAC panel. It requested the panel to address the above aspects in the draft standard.  The Committee approved the recommendation of the panel. The Committee agreed to rename the panel to ‘Identification, Storage, Transportation and Handling of Refrigerants / Cylinders’ Panel. |
| 1. 16 | 4.1 (17) | Query onProduct Manual referred in IS 1391 (Part 1& 2) :2023 and IS 8148:2018, has been received from Shri Rahul Ramtekkar of JCI Hitachi vide email dated 03 April 2023:  The Committee deliberated that basic product manual should be in hard format.  Shri P K Mukherjee suggested to include consumer organizations to the panel.  The Committee requested the panel to discuss the above and provide recommendation in the next meeting. | The recommendation from the panel is awaited.  The Committee may **NOTE**. | The Committee requested the panel for Room AC and Heat pumps to provide its recommendation. |
| 1. 17 | - | **Comment on IS 14618:2022 'Automotive vehicles Air-conditioning and heating systems thermal performance Method of measurement (Second Revision)'** | Email had been received from M/s The Automotive Research Association of India (ARAI) dated 05 July 2024 regarding Ministry of Road Transport and Highways (MoRTH) notification under the Central Motor Vehicle Rule 125-C, Sub-rule (4) vide MoRTH notification GSR 886 (E) dated 8th December 2023, mandating the fitment of  air conditioning  system in the  cabin of vehicles of N2 and N3 categories and to be  in accordance with  IS 14618:2022 'Automotive vehicles Air-conditioning and heating systems thermal performance Method of measurement (Second Revision)'.  ARAI has proposed to issue an amendment to the standard IS 14618:2022 for the implementation of the same under CMVR. The justification from ARAI to issue the above amendment is reproduced as follows:    "*We have recently gone through the standard IS 14618:2022 which deals with the thermal performance of air conditioning and heating systems. The standard specifies the requirement of measuring the nose/face level temperature and recording of the same, but the acceptance criteria is not specified. Therefore, there is an urgent need to issue an amendment to the standard and support the implementation of the same under CMVR.*    *We are hereby enclosing the proposed amendment to the standard which may be urgently taken up with MED 03 committee of BIS for issue of amendment to this standard at your very earliest.*"  Subsequently, various comments were received on IS 14618:2022 from the stakeholders.  Accordingly, MED 03 Chairperson, BIS MED, BIS TED and Panel for Automotive Air-Conditioning and Mobile Air-Conditioning, have disposed of all the comments during 7th, 8th and 9th meeting of the panel on 08 August 2024, 02 September 2024 and 06 September 2024. The MoM are attached here.    Accordingly, the draft amendment no.1 to IS 14618:2022 has been provided by the panel on 23 September 2024 for wide circulation. The draft is attached here.    ‘This is further to the discussions during 9th MED 03 meeting held on 6th September’2024 pertaining to one of the SIAM amendment proposals regarding Soaking Duration (Refer Sr. No. 14 of Annex-2 of the attached MoM).  However, one comment has been received from M/s TATA Motors ‘You are aware that we are the market leaders in the Commercial Vehicles and we have commissioned well equipped with HVAC Full Vehicle Advanced Test Facilities internationally accredited for experimenting & validating TML range of products cutting across business units.  Recently, our domain experts have evaluated various types of vehicular cabins in accordance with the currently mentioned below provision in Table 1 -Annexure A of IS 14618:2022 (Rev.2).  “Soaking duration (minutes)      : Time to reach at least 15 °C more than ambient (that is, 55 °C average nose temperature at 40 °C ambient) and shall be more than 1 h.”  The results of the verification & evaluation are attached as PDF file for reference & kind consideration.  Based on the above, we would like to recommend updations in the requisite clause capturing the exact situation in its entirety for the intended purpose of AC Fitment CMVR certification & Approval in N2 & N3 Category Vehicles.  “Time to reach at least 10°C more than ambient (that is, 50°C average nose temperature at 40 °C ambient) and shall be at least 1 h.”  Kindly request you to consider the submissions based on the experimental results provided’.    The Committee may **CONSIDER** and **DECIDE**.  The nomination of the Convener of the panel, may also be **REVIEWED** by the Committee. | The Committee approved the recommendation of the panel except the comment at Sl no.14 of 9th meeting of the panel. The Committee in detail, reviewed the comment has been received from M/s TATA Motors along with its justification document provided. The Committee following observations and discussions:   1. Solar Load is limited to available climatic test chambers which 1000 W/m2 at present. 2. The graphs in the justification document, are becoming flat when cabin temperature near to 50°C is achieved.   Considering the notification of MoRTH, the Committee requested the following Working Group to resolve the above comment:   1. Shri V Manjunath (Convener); 2. Shri Chethan Tholpady of Copeland; 3. Shri Srinivasu Moturi of Voltas; and 4. The Convener and all the members of panel MED03:P28.   The Committee requested the above WG to expedite and provide the revised draft amendment no.1 to IS 14618:2022 within 15 days. The Committee approved the draft so received for wide circulation for one month time. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel.  The Committee reviewed the past 3 attendance of the panel MED 03:P28 and revised the panel composition as follows:   1. Shri A A Badusha of Automotive Research Association of India, Pune (Convener) 2. Ashok Leyland Limited, Chennai 3. Automotive Research Association of India, Pune 4. Calsonic Kansei Motherson Auto Products Private Limited, Kanchipuram 5. Carrier Air Conditioning and Refrigeration Limited, Gurugram 6. Denso International India Private Limited, Gurugram 7. Hanon Automotive Systems India Pvt Ltd 8. Honda Cars India Research and Development Limited, Noida 9. Honeywell International India Private Limited, Gurugram 10. Indian Institute of Technology Delhi, New Delhi 11. Ingersoll Rand India Limited, Bengaluru 12. International Centre of Automotive Technology, Manesar 13. MAHLE ANAND Thermal Systems Private Limited, Pune 14. MG Motor India Private Limited , Gurugram 15. Mahindra and Mahindra Limited, Mumbai 16. Maruti Suzuki India Limited, Gurugram 17. Refrigeration and Air Conditioning Manufacturers Association, New Delhi 18. Renault India Private Limited, Mumbai 19. Sanden Vikas (India) Private Limited, Faridabad 20. Subros Limites, New Delhi; and 21. Tata Motors Limited, Pune. |
|  | 5.5 | **Amendment no.4 to IS 11329 : 2018 Finned type heat exchanger for room air conditioner (First Revision)**  The Committee deliberated at length and it pointed out to modify the 5.3 b) of IS 11329: 2018 to specifically refer the applicable clauses of IS 737. In addition, it was also proposed to review the clauses on copper tubes referring IS 10773 as IS 10773 does not cover inner grooved tube. So, IS 11329 should refer to only relevant clauses of IS 10773.  Considering the above, the Committee requested Shri Srinivasu Voltas, Shri P K Mukherjee and the panel to provide the draft amendment to the Committee for approval via email or panel meeting. | The 19th panel meeting was held on 05 September 2024 to dispose of the comments for the draft amendment no. 4 to IS 11329: 2018. The minutes of meeting is attached here.    The committee may **CONSIDER** and **DECIDE.** | The Committee requested MS to prepare the draft amendment no. 4 to IS 11329: 2018 in consultation with the Panel Convener. The Committee decided to wide circulate the draft for two months time. If no comment is received, the Committee approved the draft for printing.  The comment if received shall be disposed by the panel. |
|  | - | **-** | As per the directions of the CA of BIS, unless a Wide Circulation Draft has already been issued and a revision or amendment is required due to changes in the ISO/IEC standard, no ISO/IEC standards or standards from other Standards Development Organizations shall be adopted without prior approval from the DG henceforth.  The proposal for taking up the adoption of a standard must elaborate the advantages and relevance of the adoption in the Indian context. | The Committee noted the information.  Shri V Manjunath of UL, appreciated this new guideline. |

***\**** *The Item number refers to the proceedings of the last meeting of MED 03.*

**ITEM 5** **COMMENTS ON PUBLISHED STANDARDS**

**5.1 IS 7872: 2020 Deep Freezers ― Specification**

Shri Srinivasu Moturi informed that there is editorial modification is required in IS 7872:2020 to avoid ambiguity. He agreed to provide his comments in the commentating template. The Committee requested the panel to provide its recommendation on the comment so received and previous comments of UL and additional comments of Voltas, by the next meeting. Item 8.1, Sl no. 6.

**5.2 IS 2370: 2014 ‘Walk-in Cold Rooms — Specification’**

The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting.

**5.3 IS 1391 (Part 1) : 2023 Room Air Conditioners Specification Part 1 Unitary Air Conditioners (Fourth Revision) and IS 1391 (Part 2) : 2023 Room Air Conditioners Specification Part 2 Split Air Conditioners (Fourth Revision)**

The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting.

**5.4 IS 17550 (Part 1) : 2021 Household Refrigerating Appliances Characteristics and Test Methods Part 1 General Requirements**

The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting.

**5.5 IS 17693: 2022 Non-Electric Cooling Cabinet Made of Clay**

The Committee decided to discuss this item in the next meeting.

**5.6 IS 18848 : 2024 Non-Ducted Portable Air-Cooled Air Conditioners and Air-to-Air Heat Pumps having a Single Exhaust Duct - Testing and Rating for Performance**

The Committee requested the panel to dispose of the comment of Shri Chethan Tholpady and provide update in the next meeting.

**5.7 IS 3315:2024 Direct Evaporative Air Cooler ― Specification (Fourth Revision)**

The Committee in detail discussed each comments of VOICE.



It made following observations and discussions:

1. Sl no.1- It agreed for the editorial correction.
2. Sl no.2- Proper definition for clarity of the consumer may be given
3. Sl no.3- It discussed that the effect of TDS of water used for testing of desert cooler for grant of licence as per BIS certification, on Cooling efficiency and EER is negligible. However, the water to be used for normal running of desert cooler may become another subject for discussion. The Committee also discussed the compliance of desert coolers as per BEE labeling program during the cooler’s lifetime in terms of its efficiency/EER/star rating. It also discussed the possibility of referring IS 10500 for water used in testing of the coolers. As per one of the SDGs, water consumption of air cooler is being studied by the panel for incorporating limits of the same in the standard.
4. Sl no.4- clause 7.7 may be deleted as limits are specified in the standard Cooling efficiency/air delivery/power input/EER.
5. Sl no.- the value given is minimum EER requirement.

The Committee requested the panel to dispose of the comments of VOICE and provide update in the next meeting.

**ITEM 6 PANELS AND WGs HELD SINCE THE LAST MEETING**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Name of the Panel** | **Panel Recommendation** | **Decision of 42nd meeting** |
|  | Commercial Air Coolers | The 4th panel meeting was held on 06 September 2024. The MoM is attached here.    The Committee may **NOTE.** | The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting. |
|  | Heat Pump Water Heaters | The 2nd panel meeting was held on 11 September 2024. The MoM is attached here.    The Committee may **NOTE.** | The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting. |
|  | Selection, Operation, and Maintenance of RACs | The 6th panel meeting was held on 16 September 2024.  See Item 4.1 Sl No.15. | See Item 4.1 Sl No.15. |
|  | Finned Type Heat Exchanger | The 18th and 19th panel meeting were held on 27 June 2024 and 05 September 2024.  See Item 4.1 Sl No.4 and 21. | See Item 4.1 Sl No.4 and 21. |
|  | Room Air Conditioner and Heat Pumps | The 13th meeting of the panel was held on 10 September 2024.  See Item 5.3. | See Item 5.3. |
|  | Walk-in Cold Rooms | The 3rd meeting of the panel was held on 10 September 2024.  See Item 5.2. | See Item 5.2. |
|  | Safety pertaining to refilled AC gas | The 1st meeting of Panel was held on 17 September 2024.  See Item 4.1 Sl No.18. | See Item 4.1 Sl No.18. |
|  | Service Valves | The 1st meeting of Panel was held on 09 September 2024. The MoM is attached here.    The Committee may **NOTE.** | The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting.  The Committee agreed to transform this WG to panel ‘Service Valves’. |
|  | Circular Economy (Sustainability) | The 2nd meeting of Panel was held on 12 September 2024. The MoM is attached here.    The Committee may **NOTE.** | The Committee approved the recommendation of the panel. The Committee requested the panel to provide update in the next meeting.  The Committee agreed to transform this WG to panel ‘Sustainability’.  The Committee also revised the panel composition. See Annex 3. |
|  | Automotive Air-Conditioning and Mobile Air-Conditioning | The 7th, 8th and 9th meeting of the panel were held on 08 August 2024, 02 September 2024 and 06 September 2024.  See Item 4.1 Sl No.20. | See Item 4.1 Sl No.20. |
|  | Direct Evaporative Air Cooler | The 19th and 20th meeting of the panel were held on 01 July and 15 July 2024.  See Item 4.1 Sl No.6. | See Item 4.1 Sl No.6. |

**ITEM 7 PROGRAMME OF WORK**

The Committee noted the information.

**ITEM 8 ROLLING ANNUAL ACTION PLAN OF 2024-2025**

**8.1 New Work Item Proposal – Carried Forward**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Subject / IS** | **Decision of 41st meeting** | **Present Status** | **Decision of 42nd meeting** |
|  | MED/03/22778 Electronic Expansion Valve - Specification | Vide Item 4.1, Sl no. 13 | Vide Item 4.1, Sl no. 13 | Vide Item 4.1, Sl no. 13 |
|  | [MED/03/18921](https://www.services.bis.gov.in:8071/php/BIS_2.0/StandardsFormulationV2/Upload3.php?ID=SFJuRFI5Y2RSWHU5UzRDQTRGTnFqQT09) Multiple split-system air conditioners and air-to-air heat pumps (VRF air conditioners) - Specification | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | MED/03/17393 Air Handling Units -Specification | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | Heat pump water heaters - Testing and rating for performance Part 1 Heat pump water heater for hot water supply based on ISO 19967-1:2019 | Vide Item 6, Sl no. 2 | Vide Item 6, Sl no. 2 | Vide Item 6, Sl no. 2 |
|  | NWIP proposal on Service Valves related to HVAC | Vide Item 6, Sl no. 8 | Vide Item 6, Sl no. 8 | Vide Item 6, Sl no. 8 |
|  | NWIP proposal on highly energy efficient deep freezer products such as combination product in deep freezer : Cooler & freezer and vertical models, also PCM /Eutectic based freezers by Shri Srinivasu Moturi | Shri Srinivasu apprised the members of the current market of combination products for cooling as well as freezing. He informed that IS 7872:2020 does not include the combination products and also the freezers on wheels which are eutectic based freezers.  So, the Committee deliberated and requested the panel on deep freezers to review the NWIP and provide recommendation by the next meeting. | The Panel recommendation is awaited.  The committee may **CONSIDER** and **DECIDE**. | The Committee requested the panel to provide its recommendation in the next meeting. |
|  | NWIP proposal on Room ACs for commercial & industrial applications by Shri Srinivasu Moturi | - | Following is the comment by Shri Srinivasu on email dated 15 July 2024  :  ‘Regarding 1391 part1 & 2 : the scope of standard is for Residencial , Commercial & Industrial application,  However each application requirements are different  the current standard is not satisfy exactly for commercial & industrial applications.  also, dehumidification effect also need to be defined appropriately in the current standard.  regarding industrial the requirements are like high ambient , applications can be in Industrial chemical  fumes etc. , which require the unit construction totally changes.’  The committee may **CONSIDER** and **DECIDE**. | Shri Srinivasu informed the members of this new subject. He said that the AC for industrial/commercial environment which sustains high temperature and dust, has been studied by Voltas and have been under R&D in Voltas. He also apprised that fin material of Heat exchangers are different. The Committee after detailed deliberation agreed to formulate a standard on ‘Room ACs/Heat pumps for commercial/industrial purposes’.  The Committee requested Panel for Room ACs and Heat Pumps to provide its recommendation on the working draft for the above standard. A suitable title of the standard may be recommended by the panel. It requested the panel to provide update in the next meeting. |

**8.2 Standard under Five year Review– Carried Forward**

As on on-going activity, Sectional Committee reviews the Indian Standards formulated by it at an interval of five years from the date of publication. Following is the list of standards reviewed during the last year but pending for publication.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Subject / IS** | **Decision of 41st meeting** | **Present Status** | **Decision of 42nd meeting** |
|  | MED/03/19252/ IS 16672 (Part 2) ‘Refrigerated Display Cabinets Part 2 Classification, Requirements and Test Conditions’ | Vide Item 4.1 Sl No.10 | Vide Item 4.1 Sl No.10 | Vide Item 4.1 Sl No.10 |
|  | MED/03/25447/ IS 3615 REFRIGERATION AND AIR CONDITIONING GLOSSARY OF TERMS ( Third Revision ) | Vide Item 4.1 Sl No.11 | Vide Item 4.1 Sl No.11 | Vide Item 4.1 Sl No.11 |
|  | MED/03/25074/ IS 17570 (Part 4) ‘Air Filters for General Ventilation Part 4 Conditioning Method to Determine the Minimum Fractional Test Efficiency First Revision’ | Vide Item 4.1 Sl No.12 | Vide Item 4.1 Sl No.12 | Vide Item 4.1 Sl No.12 |
|  | MED/03/22235/ IS 17550 (Part 1) Household Refrigerating Appliances - Characteristics and Test Methods Part 1 General Requirements (First Revision) | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | MED/03/22236/  IS 17550 (Part 2) Household Refrigerating Appliances - Characteristics And Test Methods Part 2 Performance Requirements (First Revision) | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | MED/03/22237/ IS 17550 (Part 3) Household Refrigerating Appliances - Characteristics and Test Methods Part 3 Energy Consumption and Volume ( First Revision ) | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |
|  | MED/03/24169 Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements For Commercial Refrigerating Appliances and Ice-Makers With An Incorporated Or Remote Refrigerant Unit Or Motor-Compressor (Modified adoption of IEC 60335-2-89:2019) | - | The document is under printing.  The Committee may **NOTE**. | The Committee noted the information. |

**8.3 Standard under Five year Review – due for 2024-2025**

As on on-going activity, Sectional Committee reviews the Indian Standards formulated by it at an interval of five years from the date of publication. Following is the list of standards pending to be reviewed for this year.

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| --- | --- | --- | --- | --- |
| **Sl No.** | **Subject / IS** | **Decision of 41st meeting** | **Present Status** | **Decision of 42nd meeting** |
|  | IS 2370 : 2014 Walk - In cold rooms - Specification (First Revision) | The Committee decided to reaffirm the standard. | The standard has been reaffirmed in June 2024.  The Committee may **NOTE**. | The Committee noted the information. |
|  | IS 3615 : 2020 Glossary of Terms Used in Refrigeration and Air Conditioning ( Second Revision ) | The Committee decided to reaffirm and revise the standard. | The standard has been reaffirmed in June 2024 and the revised draft standard is under printing, *see* Item 4.1 Sl No.11.  The Committee may **NOTE**. | The Committee noted the information. |
|  | IS 7872 : 2020 Deep Freezers - Specification ( Second Revision ) | The Committee decided to reaffirm the standard. | The standard has been reaffirmed in June 2024.  The Committee may **NOTE**. | The Committee noted the information. |
|  | IS 302 (Part 2/Sec 24) : 1994/ IEC 60335-2-24 Safety of household and similar electrical appliances: Part 2 particular requirements: Sec 24 refrigerators, food - Freezers and ice - Makers | The Committee decided to reaffirm the standard. | The standard has been reaffirmed in June 2024.  The Committee may **NOTE**. | The Committee noted the information. |

**8.4 Review of Pre-2000 Standards**

The BIS management has decided to revise the old standards which are A5 or pre-2000 and requested the relevant technical committees to take up the revision of the standard. In this regard, the member secretary of the committee is also directed to review the standards at their level and prepare comments in the proforma provided by the management. Further, the proforma along with its details will be put up to the committee for its review and further decision.

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| --- | --- | --- | --- |
| **Sl No.** | **Subject / IS** | **Present Status** | **Decision of 42nd meeting** |
|  |
|  | IS/ISO 11650 : 1999 Performance of refrigerant recovery and/or recycling equipment | This standard was last reviewed and reaffirmed in September, 2022.  1999 version is the latest valid version. Accordingly, the standard may be reaffirmed.  The Committee may **CONSIDER** and **DECIDE**. | The Committee noted the information. |
|  | IS/ISO 13261-1 : 1998 Sound power rating of air - Conditioning and air - Source heat pump equipment: Part 1 non - Ducted outdoor equipment | This standard was last reviewed and reaffirmed in August, 2021.  1998 version is the latest valid version. Accordingly, the standard may be reaffirmed.  The Committee may **CONSIDER** and **DECIDE**. | The Committee noted the information. |
|  | IS/ISO 13261-2 : 1998 Sound power rating of air Conditioning and air - Source heat pump equipment: Part 2 non - Ducted indoor equipment | This standard was last reviewed and reaffirmed in September, 2022.  1998 version is the latest valid version. Accordingly, the standard may be reaffirmed.  The Committee may **CONSIDER** and **DECIDE**. | The Committee noted the information. |
|  | IS 1474 : 1959 Specification for commercial refrigerators | The standard is being superseded by upcoming standard MED/03/19252/ IS 16672 (Part 2) ‘Refrigerated Display Cabinets Part 2 Classification, Requirements and Test Conditions’.  The Committee may **NOTE.** | The Committee noted the information. |
|  | IS 5111 : 1993/ ISO 917:1989 Testing of refrigerant compressors (First Revision) | This standard was last reviewed and reaffirmed in May, 2022.  However, ISO 917 is under development CD stage at ISO with ref. no. ISO/CD 18976 ISO 917, Testing of refrigerant compressors.  Accordingly, the standard may be reaffirmed.  The Committee may **CONSIDER** and **DECIDE**. | The Committee noted the information. |
|  | IS 302 (Part 2/Sec 24) : 1994 Safety of household and similar electrical appliances: Part 2 particular requirements: Sec 24 refrigerators, food - Freezers and ice - Makers | The standard has been reaffirmed in June 2024.  The Committee may **NOTE**. | The Committee noted the information. |

**ITEM 9 NEW SUBJECT PROPOSAL RECEIVED**

**a)** The Committee accepted the NWIP proposal ‘Heat recovery ventilators and energy recovery ventilators Testing and calculating methods for seasonal performance factor Part 1: Sensible heating recovery seasonal performance factors of heat recovery ventilators (HRV)’ based on ISO 5222-1:2023, and formulated the following new panel to provide its recommendation on the working draft for the above standard:

1. Dr Jyotirmay Mathur (Convener);
2. Shri V. Manjunath;
3. Shri Vikas Mehta;
4. Shri Shankar Sapaliga; and
5. Shri Rahul Ramtekkar.

The Committee requested the panel to provide update in the next meeting.

**b)** The Committee discussed the special purpose commercial/industrial refrigerators like IS 17547 : 2021 ‘Specification for vaccine freezer or combined vaccine freezer and water-pack freezer: compression cycle — general requirements and testing methods’. The Committee after detailed deliberation agreed to formulate a standard on the refrigerators which are not yet formulated under MED 03 and formulated the following new panel to provide its recommendation in the next meeting:

1. Shri Chethan Thopady (Convener);
2. Shri Srinivasu Moturi of Voltas;
3. Shri Shankar Sapaliga;
4. Representative of Godrej;
5. Representative of Western Refrigeration;
6. Representative of Rockwell;
7. Representative of UL; and
8. Representative of Frigoglass.

**ITEM 10 NEW SUBJECTS**

**10.1** The Committee noted the information.

**10.2** The Committee noted the information.

**10.3** **Assistance for framing Relevant National Standards**

The Committee noted the information.

**ITEM 11 STATUS OF INDIAN STANDARDS**

**11.1 Quality Control Order**

The Committee noted the information.

**11.2 Proposed Quality Control Orders**

The Committee noted the information.

**11.3 BIS Domestic Licences**

The Committee noted the information.

**11.4 Quality Control Order for Machinery and Electrical Equipment Safety**

The Committee noted the information.

**ITEM 12 INTERNATIONAL ACTIVITIES**

**12.1** The Committee noted the information.

**12.2** The Committee noted the information.

**12.3 List of experts in various ISO/IEC**

The Committee updated the expert list as follows:

|  |  |  |
| --- | --- | --- |
| **ISO/TC 86** **Refrigeration and air-conditioning** | | |
| ISO/TC 86/SC 1 | Safety of Refrigeration Systems | Shri Sunil Jain of Blue Star,  Shri Vikas Mehta of Chemours  Shri Bimal Tandon of Carrier  Shri Avinash Kumar of M/s Honeywell  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 1/WG 1 | Safety and environmental requirements for refrigerating systems and heat pumps | Shri Srinivasu of Voltas,  Shri Vikas Mehta of Chemours  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 4 | Testing and rating of Refrigerant Compressors | Shri Chetan Tholpady of Copeland  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 4/WG 1 | Testing and rating of refrigerant compressors | Shri Chetan Tholpady of Copeland  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 4/WG 2 | Positive displacement refrigerant compressor | Shri Chetan Tholpady of Copeland |
| ISO/TC 86/SC 6 | Testing and rating of Air-Conditioners and Heat Pump | Dr. Jyotirmay Mathur of MNIT Jaipur  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 6/WG 1 | Air-source air-conditioners and heat pumps | Miss Neha Thakur, BIS |
| ISO/TC 86/SC 6/WG 3 | Water and brine source heat pumps and air-conditioners | Miss Neha Thakur, BIS |
| ISO/TC 86/SC 6/WG 10 | Energy recovery ventilators | Dr. Jyotirmay Mathur of MNIT Jaipur |
| ISO/TC 86/SC 6/WG 12 | Heat pump water heaters | Dr. Jyotirmay Mathur of MNIT Jaipur |
| ISO/ TC 86/ SC6/ WG15 | Advanced performance standards | Dr. Jyotirmay Mathur of MNIT Jaipur  Shri Srinivasu M of Voltas  Dr. Yash Shukla  Shri V Manjunath of UL |
| ISO/TC 86/SC 7 | Testing and rating of Commercial Refrigerated Display Cabinets | - |
| ISO/TC 86/SC 7/WG 1 | Refrigerated, blast cabinets and ice makers for professional use | - |
| ISO/TC 86/SC 7/WG 2 | Commercial beverage coolers and ice cream freezers | - |
| ISO/TC 86/SC 8 | Refrigerants and Refrigeration Lubricants | Shri Sunil Jain of Blue Star,  Shri Vikas Mehta of Chemours, and  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 8/MA | ISO 817 Maintenance agency | - |
| ISO/TC 86/SC 8/WG 5 | Refrigerants - Designation and safety classification | Shri Sunil Jain of Blue Star  Shri Vikas Mehta of Chemours, and  Miss Neha Thakur, BIS |
| ISO/TC 86/SC 8/WG 7 | Refrigerant properties | Miss Neha Thakur, BIS |
| ISO/TC 86/SC 8/WG 8 | Burning Velocity Test Methods | - |
| ISO/TC 86/SC 8/TF 3 | Refrigerant stability classification | Shri Vikas Mehta of M/s The Chemours |
| **IEC/TC 59/ SC 59M ‘Performance of electrical household and similar cooling and freezing appliances’** | | |
| WG 4 | Electrical household and similar cooling and freezing appliances, food preservation and storage | Shri Srinivasu of Voltas  Miss Neha Thakur, BIS |
| WG 5 | TC 59/WG 2 - Acoustical noise of household appliances | - |
| MT 2 | Electrical household and similar cooling and freezing appliances, maintenance of performance standard | Shri Srinivasu of Voltas  Miss Neha Thakur, BIS |
| **IEC/TC 61/SC 61 C ‘Safety of refrigeration appliances for household and commercial use’** | | |
| WG 4 | IEC 60335-2-89-A2/Ed2: Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor | Shri Vikas Mehta of Chemours,  Miss Neha Thakur, BIS |
| WG 5 | Review the fire safety of products covered by IEC 60335-2-24 | - |
| MT 1 | Safety of motor-compressors | Copeland / Danfoss  Miss Neha Thakur, BIS |
| MT 7 | Maintenance Team for IEC 60335-2-118 - Particular requirements for professional ice-cream makers | - |
| JWG 3 | Resistance to refrigerants of winding wires | - |
| EG 6 | Editing Committee | - |
| **IEC/TC 61/SC 61 D ‘Appliances for air-conditioning for household and similar purposes’** | | |
| WG21 | WG 21 Address A2L, A2 and A3 refrigerants and maintenance of 60335-2-40 | Shri V Manjunath of UL,  Shri Vikas Mehta of Chemours Miss Neha Thakur, BIS |
| MT 19 | Revision of 60335-2-104 work | - |
| MT 28 | Maintenance of IEC 60335-2-40 | Shri Vikas Mehta of Chemours |
| MT 29 | Maintenance of requirements for detection of leaked refrigerant | Shri Vikas Mehta of Chemours |
| Ad hoc Group 30 | Alignment of requirements for flammable refrigerant systems in appliances | Shri Vikas Mehta of Chemours |
| WG 27 | Air conditioners for cooling driver and passenger compartments when the vehicle is stationary | Shri Vikas Mehta of Chemours  Ms Shweta Kulkarni of Trane Technologies |

**12.4 Participation in ISO/IEC meetings**

**12.4.1 Upcoming meetings of ISO/IEC**

The Committee approved the following nomination and requested members to provide draft India Viewpoint for MED 03 approval through email:

| **Date** | **Month** | **Location** | **TC/SC** | **Approved Nomination** |
| --- | --- | --- | --- | --- |
| 07-10 | October 2024 | Peachtree Corners (United States) | ISO/TC 142 ‘Cleaning equipment for air and other gases’ | - |
| 03 -06 | November 2024 | Zhu Hai Sai, China | ISO/TC 86/SC 6/WG 10 ‘Energy recovery ventilators’ | Shri Jyotirmay Mathur of MNIT Jaipur |
| 02-06 | December 2024 | London (United Kingdom) | TC 61/SC 61D Plenary meeting and its WG meetings | Shri Vikas Mehta of Chemours |
| 09-13 | December 2024 | IEC | IEC/ TC 61/SC 61C Plenary meeting and its WG meetings | Shri Vikas Mehta of Chemours  Ms Neha Thakur, MED, BIS |

**12.4.2 Proposal to host ISO meeting in India**

The Committee noted the information.

**12.4.3 ISO/IEC meetings participated**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Month** | **Location** | **TC/SC** | **Nomination Received** | **Status** |
| 06-09 | September 2024 | Eschborn (Germany) | IEC/TC 61/SC 61C/WG 4 Household and similar electrical appliances - Safety - Part 2-89 | Shri Vikas Mehta of Chemours | Report of the meeting is awaited. |
| 10-13 | September 2024 | Eschborn (Germany)/ Denmark | SC61D, MT 28 & 29 | Shri Vikas Mehta of Chemours | Report of the meeting is awaited. |
| 11 | September 2024 | Virtual | ISO TC 86 SC 8 TF 3 ‘Reactivity classification of refrigerants’ | Shri Vikas Mehta of Chemours | Report of the meeting is awaited. |

The Committee requested Shri Vikas Mehta of Chemours to provide the meeting reports within this month.

**12.4.4 New subject proposal to ISO/ IEC**

The Committee noted the information and requested MS to provide update in the next meeting.

**ITEM 13** **PRIORITY LIST**

The Committee noted the information.

**ITEM 14 RECOMMENDATION OF THE PLANNING AND DEVELOPMENT ADVISORY COMMITTEE (PDAC) OF BUREAU OF INDIAN STANDARDS**

The Committee noted the information.

**ITEM 15 TRANSLATION OF INDIAN STANDARDS FROM ENGLISH TO HINDI**

The Committee noted the information.

**ITEM 16 E-SALE OF INDIAN STANDARDS**

The Committee noted the information.

**ITEM 17 DATE AND PLACE FOR THE NEXT MEETING**

See Annual Calendar at Item 3 Sl no. i).

**ITEM 18 ANY OTHER BUSINESS**

There being no other business, the meeting ended with a hearty vote of thanks to the Chair and all the members present during the meeting.

**Annex 1**

(Item**2.2.1**)

**COMPOSITION OF REFRIGERATION AND AIR CONDITIONING SECTIONAL COMMITTE, MED 03**

|  |  |  |
| --- | --- | --- |
| **Meeting** | **Date** | **Place** |
| 38th | 17 July 2023 | WebEx |
| 39th | 13 Dec 2023 | WebEx |
| 40th | 21 Mar 2024 | WebEx |
| 41st | 24 June 2024 | WebEx |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl No** | **Organisation Represented** | **Principal Member/**  **Alternate Member** | **38th** | **39th** | **40th** | **41st** | **Total** |
|  | Indian Institute of Technology, Roorkee | Prof..(Dr.) Ravi Kumar  (*Chairman*) | Y | Y | Y | Y | 4/4 |
|  | BSH Household Appliances Manufacturing Pvt Ltd., Chennai | Shri V.K. Loganathan  Shri A. Balasubramanian (Alt) | Y | Y | Y | Y | 4/4 |
|  | Blue Star Limited, Mumbai | Shri Jitendra Bhambure  Shri Sunil Kumar Jain (Alt)  Ms. Sneha Harsora (YP) | Y | Y | Y | Y | 4/4 |
|  | Bureau of Energy Efficiency, New Delhi | Ms P. Samal  Shri Kamran Shaikh (Alt)  Ms D. Wadhwa (Alt)  Shri Dheeraj Pandey | Y | Y | Y | Y | 4/4 |
|  | CEPT University | Dr Yash Shukla | NA | Y | Y | Y | 3/3 |
|  | [Carrier Air Conditioning and Refrigeration Limited, Gurugram](javascript:;) | Shri Bimal Tandon  Shri Manmohan Kulashri (Alt)  Shri Jatinder Sharma (Alt) | Y | Y | N | Y | 3/4 |
|  | Central Power Research  Institute, Bengaluru | Dr P. Chandra Sekhar  Shri Gujjala B.Balaraja (Alt) | Y | N | Y | N | 2/4 |
|  | Central Public Works Department, New Delhi | Shri Ram Raj Meena  Shri Ramayan Prasad Gupta (Alt) | NA | NA | NA | Y | 1/1 |
|  | Copeland India Private Limited, Pune | Shri Chetan Tholpady | Y | Y | Y | Y | 4/4 |
|  | Daikin Air Conditioning India Private Limited, Gurugram | Shri Gaurav Mehtani | Y | Y | Y | Y | 4/4 |
|  | Danfoss Industries Pvt Ltd, Gurugram | Shri Madhur Sehgal  Shri K.L. Nagahari (Alt)  Shri M.N.S.V Kiran Kumar (Alt) | Y | N | Y | Y | 3/4 |
|  | Directorate General of Quality Assurance, Ministry of Defence, New Delhi | Lt. Col. Deepak Sharma  Shri S.S. Nikam (Alt) | Y | N | Y | Y | 3/4 |
|  | Electrical Research and Development Association., Vadodara | Shri Guatam Brahmbhatt  Shri Rakesh Patel (Alt) | Y | Y | Y | Y | 3/4 |
|  | [Frigoglass India Private Limited, Gurugram](javascript:;) | Shri Mahesh Kumar Mawai  Shri Mandeep Singh (Alt)  Ms. Ritu Chouhan (Alt) | Y | N | Y | Y | 3/4 |
|  | Godrej & Boyce Mfg. Co. Ltd (Appliance Division) | Shri Burzin J. Wadia  Shri Jasvir Singh (Alt)  Shri Narendra Shedge (Alt) | Y | N | Y | Y | 3/4 |
|  | Honeywell International India Pvt Ltd | Shri Avinash Kumar | Y | Y | N | Y | 3/4 |
|  | Indian Institute of Chemical Engineering, Kolkata | Dr D Sathiyamoorthy  Prof Sudip K Das (Alt) | Y | N | Y | Y | 3/4 |
|  | Indian Institute of Technology Madras | Dr. G. Venkatarathnam | Y | Y | Y | Y | 4/4 |
|  | Indian Society of Heating, Refrigerating And Air Conditioning Engineers (ISHRAE) | Dr Jyotirmay Mathur  Shri Ashish Rakheja (Alt)  Shri V. Manjunath (Alt) | Y | Y | Y | N | 3/4 |
|  | International Copper Association India, Mumbai | Shri Mayur Karmakar  Shri Shankar Sapaliga (Alt) | Y | Y | Y | Y | 4/4 |
|  | Intertek India Pvt Ltd, New Delhi | Shri C.M. Pathak | Y | N | Y | Y | 3/4 |
|  | Johnson Controls-Hitachi, Ahmedabad | Shri Rahul Ramtekkar  Ms. Heena Ramsinghani (YP) | Y | Y | Y | Y | 4/4 |
|  | LG Electronics India Pvt Ltd , New Delhi | Shri Aditya Anil | Y | Y | Y | Y | 4/4 |
|  | Ministry of Environment Forest and Climate Change, New Delhi | Shri Aditya Narayan Singh  Dr Mahendra Phulwaria(Alt) | NA | NA | NA | Y | 1/1 |
|  | Refrigeration & Air-conditioning Manufacturers Association , New Delhi | Shri Kanwaljeet Jawa  Shri Harsh Vardhan Pant (Alt) | Y | Y | Y | Y | 4/4 |
|  | Samsung India Electronics Ltd., Noida | Shri Kalicharan Sahu  Shri Amit Kumar Jha (Alt) | Y | Y | Y | Y | 4/4 |
|  | Sierra Aircon Pvt Ltd | Shri D.K. Mudgal  Shri S. Dhiman (Alt) | Y | N | Y | Y | 3/4 |
|  | The Chemours India Pvt Ltd., Gurgaon | Shri Vikas Mehta  Shri Nishit Shah (Alt) | Y | Y | Y | Y | 4/4 |
|  | Trane Technologies India Private Limited, Bengaluru | Shri M. Venkanna   Shri J. Gurusamy (Alt)  Ms Shweta Kulkarni (Alt 2) | Y | Y | N | Y | 3/4 |
|  | UL India Pvt Ltd, Bengaluru | Shri V. Manjunath  Shri Satish Kumar (Alt) | Y | Y | Y | Y | 4/4 |
|  | Voltas Ltd, Mumbai | Shri Srinivasu Moturi  Shri A.D. Kumbhar (Alt) | Y | Y | Y | Y | 4/4 |
|  | Voluntary Orgn In Interest of Cons Education New Delhi | Shri H. S. Wadhwa  Shri B.K. Mukhopadhyay (Alt) | Y | Y | Y | Y | 4/4 |
|  | In Personal Capacity | Shri J. K. Agrawal | Y | Y | Y | Y | 4/4 |
|  | In Personal Capacity | Shri P.K. Mukherjee | Y | Y | Y | Y | 4/4 |

**ANNEX 2**

(Item **2.2.4**)

**EXTRACTS ON GUIDELINES FOR PARTICIPATION IN THE TECHNICAL COMMITTEE WORK OF BIS**

|  |
| --- |
| * Where an organization offered representation in BIS work feels that it has limited interests in the scope of activity of a committee it shall communicate so to the committee secretary before accepting the representation. * All organizations represented in a technical work of BIS I shall be conscious of the national role they play in the preparation of standards. They shall nominate the best available ta1.ent for this work and ensure that their nominees are fully briefed, and utilize all opportunity to express their organization’s view point in the Bureau forums. For continuity of participation, it shall be ensured that representatives once nominated are continued as long as possible and changes where inevitable are proceeded smoothly and shall be communicated to Secretary without delay. * Organizations participating in the technical work of the Bureau may also consider initiating wherever possible formal standardization activity within the organization that would amongst other things aid participation and act as permanent liaison with Bureau on all standardization matters and shall coordinate adoption and implementation of national standards. * Organizations 'representing the interests of a group/association/federation may ensure that all constituent members (whose interest he/she represent) are consulted/kept informed of the committee work. * All expenses related to the nominees for participating in this activity are to be borne by the participating organizations. * Authorities nominating representatives as members of Sectional Committee of the Bureau, if they so choose, may nominate two representatives one to be known as the principal and the other as the alternate, subject to the following:   + Generally, one representative shall attend the meeting but if this department or body so desired both the principal and alternate may attend the meeting.   + Only the principal representative shall have the right to vote.   + In the absence of the principal representative, the alternate may exercise the right to vote.   + All documents concerned with the work of the technical committee shall ordinarily be sent to the Principal representative, if both principal and alternate representatives are located at the same station. However, if principal and alternate representatives are from different stations, all documents shall be sent to both the representatives.   + Organizations may, if they so choose, nominate experts by designation instead of by name.   + In exceptional circumstances where a case in made out on the basis of regional representation or representation of special interests within any organization, more than one alternative may be accepted by the officer-in charge of the Division.   + Only the designated Principal/Alternate members can attend Sectional Committee meetings. In case of their absence, their representatives can attend the meetings. However, BIS should be given prior intimation in such cases. In any case, no more than two representatives from one organization can attend the committee meetings. * Comments on documents at any stage, as well as on printed Indian Standards, though are welcome at all times, members are requested to send them well in advance for inclusion in the agenda in order to consider them in the meeting. Comments received very late or brought along for tabling during the meeting will be liable not to be considered as other members have not had the opportunity to deliberate within their organization on these comments and form their viewpoint and are unable to put forth their views at a short notice. * In case there is continual failure to contribute either through correspondence or by attending meetings for a period of three years/three technical Committee meetings by the members, the membership of such organizations will be recommended for withdrawal. |

**ANNEX 3**

(Item **2.2.7**)

**MED 03: P1 Room Air Conditioners and Heat Pumps**

1. Shri P. K. Mukherjee, In Personal capacity (Convener)
2. Bureau of Energy Efficiency
3. Blue Star Limited, Mumbai
4. Carrier Air Conditioning and Refrigeration Limited,
5. CEPT University, Ahmedabad
6. Daikin Air Conditioning India Private Limited
7. Emerson Climate Technologies (India) Private Limited
8. Godrej & Boyce Manufacturing Company Limited
9. International Copper Association India
10. Intertek India Private Limited
11. Johnson Controls-Hitachi Air Conditioning India Limited
12. LG Electronics India Private Limited
13. Refrigeration and Air Conditioning Manufacturers Association
14. Sierra Aircon Private Limited
15. Trane Technologies
16. UL India Private Limited
17. Voltas Limited
18. Whirlpool India Limited
19. Dr. G. Venkatarathnam, IIT Madras
20. Shri H. S. Wadhwa of VOICE Society
21. Dr Subrata Mondal in individual capacity
22. Prof Akhilesh Arora, Delhi Technological University, Delhi

**MED 03: P2 Household refrigerator**

1. Shri P K Mukherjee (Convener),
2. Ms. P Samal, BEE
3. Dr. P Chandrashekhar, CPRI
4. Representative of VOICE
5. Shri C M Pathak, Intertek
6. Shri Satish Kumar, UL
7. Shri Rakesh Patel, ERDA
8. Shri Vijay Kumar, BSH
9. Shri Kali Charan Sahu, Samsung
10. Shri Mohinder Singh BC, M/s Whirlpool of India Limited
11. Shri Sunderamoorthy, M/s Panasonic India Pvt. Ltd.
12. Dr. J Mathur of MNIT Jaipur,
13. Representative of CEAMA, and
14. Shri Mr. Viral Shah of M/s Voltas Beko
15. Shri Aditya Anil of M/s LG.
16. Dr Subrata Mondal in individual capacity
17. Prof Akhilesh Arora, Delhi Technological University, Delhi
18. Shri Gaurav Choudhary, Haier Appliances India Pvt Ltd

**MED 03: P3 Refrigerating systems and heat pumps - Safety and environmental requirements**

1. Sh Nagahari Krishna L of M/s Danfoss Ltd (Convener)
2. Sh Chetan Tholpady from M/s Emmerson Ltd
3. Sh. Vikas Malhotra of M/s Carrier Ltd
4. Sh. Satish Kumar of M/s UL Ltd.
5. Representative from M/s Ingersol Rand
6. Representative from Ministry of Environment & Forest (MoEF)
7. Representative from Ministry of Labour & Employment
8. Shri S Devetto of ISHRAE
9. Representative from RAMA.
10. Representative from CSE

**MED 03: P4 Multiple Split Systems (Variable Refrigerant Flow)**

1. Ms. P Samal, BEE (**Convener**);
2. Shri P K Mukherjee (**Co-Convener**);
3. Shri Harshvardhan Pant from RAMA;
4. Shri Gaurav Mehtani from Daikin;
5. Shri Srinivasu M from Voltas;
6. Shri Chandra Pathak from Intertek;
7. Shri Jeyaprakash Gurusamy from Ingersoll Rand;
8. Dr. Jyotirmay Mathur from MNIT Jaipur;
9. Shri V Manjunath from UL;
10. Shri Shankar Sapaliga from Copper Association;
11. Representative from M/s Honeywell;
12. Representative from M/s Infeneon;
13. Shri Sunil Jain from Blue Star;
14. Representative from Carrier Toshiba;
15. Shri Rahul Ramtekkar from Johnson Controls –Hitachi;
16. Shri Davesh Mudgal from Sierra Aircon; and
17. Shri Manmohan K, M/s Carrier Airconditioning & Refrigeration Limited.
18. Prof Akhilesh Arora, Delhi Technological University, Delhi

**MED 03: P5 Bottle/ Beverage Coolers**

1. Shri Satish Kumar of UL (Convener)
2. Dr. Jyotirmay Mathur, MNIT Jaipur
3. Shri Sunil Jain, Blue Star
4. Shri Srinivasu M, Voltas
5. Shri Mohinder Singh, Whirlpool India
6. Shri Vishal Nichite, Western Equipment
7. Shri Mr. Mahesh Mawai, Frigoglass
8. Shri Chethan Tholpady, Emerson
9. Shri P K Mukherjee, Personal Capacity.
10. Shri Gaurav Choudhary, Haier Appliances India Pvt Ltd

**MED 03: P6 Household and similar electrical appliances - Safety of electrical heat pumps, air-conditioners and dehumidifiers**

1. Shri Nagahari Krishna L, M/s Danfoss Ltd (Convener)
2. Shri Sunil Jain, M/s Blue Star
3. Shri Bimal Tandon, M/s Carrier Airconditioning & Refrigeration Limited
4. Shri Manmohan K, M/s Carrier Airconditioning & Refrigeration Limited,
5. Shri Vikas Mehta, M/s Chemours India Pvt Limited
6. Shri Gaurav Mehtani, M/s Daikin
7. Shri Chetan Tholpady, M/s Emerson Ltd.
8. Shri Burzin Wadia, M/s Godrej & Boyce Mfg. Co. Ltd.
9. Shri Narendra Shedge, M/s Godrej & Boyce Mfg. Co. Ltd.
10. Shri Rahul Ramtekkar, M/s Johnson Controls Hitachi-Air Conditioning India
11. Dr. Nitin Karwa, M/s Honeywell
12. Dr. Krishnakant Agarwal, IIT Delhi
13. Shri Shankar Sapaliga, International Copper Association India
14. Dr. Jyotirmay Mathur, MNIT Jaipur
15. Representative from Ministry of Environment & Forest (MoEFCC)
16. Shri Harsh Pant, RAMA
17. Shri J M Bhambure,
18. Shri Jeyapraksh Gurusamy, M/s Trane India Pvt. Ltd
19. Shri V Manjunath, UL
20. Shri Satish Kumar, UL
21. Shri Srinivasu M, Voltas

**MED 03: P7 Ducted and Package Air Conditioners and Heat Pumps**

1. Mr Bimal Tandon of M/s Carrier (convener)
2. Representative from Bluestar
3. Representative from Voltas
4. Representative from Daikin
5. Representative from Intertek
6. Representative from BEE
7. Representative from M/s Danfoss

**MED 03: P8 Ammonia Refrigeration**

1. National Centre for Cold Chain Development, Ministry of Agriculture (Convener),
2. Shri Kiran Kumar, Danfoss India (Co-convener)
3. Ministry of Environment, Forest and Climate Change (MoEFCC),
4. Association of Ammonia Refrigeration, Mumbai
5. International Institute of Ammonia Refrigeration
6. Shri MSNV Kiran, Danfoss India
7. Shri H. Wadhwa, Voluntary Organization in Interest of Consumer Voice, New Delhi
8. Shri Harsh Vardhan Pant, Refrigeration and Air Conditioning Manufacturers Association (RAMA)
9. Shri Ramesh Paranjpey, Personal Capacity, and
10. Johnsons Control

**MED 03: P9 Compressors**

1. Shri Manjunath V, UL (Convener)
2. Shri Chethan Tholpady, Emerson
3. Himanshu Mahallik, Tecumseh
4. Shri Rahul Ramtekkar, JC Hitachi
5. Shri Aditya Anil, LG Electronics
6. Shri Sunil Jain, Blue Star
7. Shri Gaurav Mehtani, Daikin
8. Shri Vijay Roy, Danfoss
9. Representative of Godrej,
10. Representative of HIGHLY
11. Representative of GMCC Compressor
12. Shri P K Mukherjee, Personal Capacity
13. Shri Srinivasu M of Voltas
14. Shri Manmohan K of M/s Carrier
15. Shri Gurusamy of M/s Ingersol Rand
16. Representative from M/s Kirloskar
17. Representative from M/s Bitzer
18. Representative from M/s Swegon
19. Representative from AAR.
20. Dr Subrata Mondal in individual capacity.

**MED 03: P10 Deep Freezer**

1. Shri P. K. Mukherjee, In personal capacity (***Convener***)
2. Shri Srinivasu Moturi, Voltas Ltd (***Co-Convener***)
3. Bureau of Energy Efficiency
4. Blue Star Ltd.
5. Frigoglass India Pvt Ltd.
6. Godrej & Boyce Mfg. Co Ltd
7. Panasonic India Pvt Ltd
8. Refrigeration & Airconditioning Manufacturers Association,
9. UL India Pvt Ltd
10. Western Refrigeration Private Limited
11. Prof Akhilesh Arora, Delhi Technological University, Delhi
12. Shri Gaurav Choudhary, Haier Appliances India Pvt Ltd

**MED 03: P11 Air Handling Unit**

1. Representative from UL (Convener),
2. Shri Bimal Tandon from Carrier
3. Representative from ISHRAE,
4. Representative from RAMA,
5. Representative from Blue Star,
6. Representative from Voltas,
7. Representative from Sierra Aircon
8. Shri Manmohan K, M/s Carrier Airconditioning & Refrigeration Limited
9. Representative of VTS Group;
10. Representative of Edge Tech;
11. Representative of Carry Air; and
12. Representative of Wave Aircon.

**MED 03: P12 Air Filters**

1. Shri V Manjunath (Convener)
2. Representative of M/s Ingersoll Rand
3. Shri Shankar Sapaliga from ICAI.
4. Shri Anil Chopra, from Camfil Air Filtration India Pvt. Ltd
5. Representative of ISHRAE
6. Representative of RAMA

**MED 03: P13 Finned Type Heat Exchanger**

1. Shri Shankar Sapaliga (Convener)
2. Representative from UL
3. Representative from Blue Star
4. Representative from Panasonic
5. Representative from LG
6. Representative from Carrier
7. Representative from RAMA
8. Representative from Amber
9. Representative from Prijai
10. Representative from Voltas
11. Representative from Daikin
12. Representative from JCI-Hitachi

**MED 03: P14 Self-Contained Ice Making Machine**

1. Shri Satish Kumar, UL India Pvt Ltd (Convener)
2. Blue Star Ltd
3. Frigoglass India Pvt Ltd
4. Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE)
5. Panasonic India
6. Voltas Ltd
7. Western Refrigeration Private Limited
8. Whirlpool India

**MED 03: P15 Household Evaporative Air Cooler and its Pumpset**

1. Shri Srinivasu, Voltas (Convener);
2. Representative from Usha;
3. Shri PK Mukherjee;
4. Representative from BEE;
5. Representative from Blue Star;
6. Representative from UL;
7. Representative from Intertek;
8. Representative from Havel;
9. Representative from Panasonic;
10. Dr. Yash Shukla, CEPT University;
11. Representative of M/s Bajaj Electrical,
12. Representative of M/s Godrej,
13. Representative of M/s Symphony Ltd.,
14. Representative of M/s V-Guard,
15. Representative of M/s Orient,
16. Representative of M/s Crompton,
17. Representative of M/s Hindware,
18. Representative of M/s Kenstar.

**MED 03: P16 Commercial Refrigerator**

1. Representative of UL (Convener)
2. Representative from ISHRAE
3. Representative from Blue Star
4. Representative from Voltas
5. Representative from Panasonic
6. Representative from Western Equipment
7. Representative from Frigoglass
8. Representative from Whirpool
9. Shri Gaurav Choudhary, Haier Appliances India Pvt Ltd

**MED 03: P17 Electronic Expansion Valves**

1. Representative from ISHRAE (Convener)
2. Representative from Danfoss
3. Representative from RAMA
4. Representative from Emerson
5. Representative from Sanhua
6. Representative from Fujikoki India Private Limited and
7. Representative from UL.

**MED 03: P18 Bottled water dispenser and Drinking water cooler**

1. Shri Srinivasu Voltas (**Convener**);
2. Shri Sheshadri H G, Voltas;
3. Shri Sunil Jain, Blue Star;
4. Shri Sushil Kumar, Blue Star;
5. Shri Pramod Trivedi, Usha Pvt. Ltd.;
6. Shri Vikas Dua, Usha Pvt. Ltd.;
7. Shri Prashant Hanwante, Veeline Media Limited;
8. Shri Satish Kumar, UL;
9. Shri C M Pathak, Intertek;
10. Shri P K Mukherjee, Personal Capacity; and
11. Representative from Carrier Midea.

**MED 03: P19 Chiller**

1. BEE(Convener);
2. Representative from ISHRAE (Co-convener)
3. Representative from RAMA;
4. Representative from Carrier;
5. Representative from ICA;
6. Representative from Blue Star;
7. Representative from Emerson;
8. Representative from UL;
9. Shri PK Mukherjee;
10. Representative from VOICE;
11. Shri Manmohan K, M/s Carrier Airconditioning & Refrigeration Limited.

**MED 03: P20 Selection, operation and maintenance of Air Conditioners and Heat Pumps**

1. Shri Shankar Sapaliga, Convener
2. Shri PK Mukherjee
3. Representative from Voltas
4. Representative from LG
5. Representative from
6. Representative from JC Hitachi- IN
7. Representative from RAMA
8. Representative from Panasonic
9. Representative from UL
10. Representative from Intertek
11. Representative from VOICE
12. Shri Ajaj Kazi, M/s Reliance World
13. Shri Shankar Chatterjee, Individual capacity
14. Shri Ravi Kumar Gondkar, M/s LEAD Consultancy and Engg Services
15. Shri Ajit Panicker, Individual capacity,
16. Shri Dharmen Dixit, Refrigeration and Air Conditioning Trade Association (RATA),
17. Shri PK Goel, and
18. Shri Bhavesh Mehta, Reliance Retail Limited.

**MED 03: P21 Room Air Conditioner efficiency evaluation**

1. Bureau of Energy Efficiency
2. Central Pollution Control Board
3. International Copper Association India
4. Intertek India Private Limited
5. Panasonic India Private Limited
6. Refrigeration and Air Conditioning Manufacturers Association
7. Sierra Aircon Private Limited
8. Voltas Limited
9. Shri P K Mukherjee, in personal capacity

**MED 03: P22 Walk in Cold Rooms**

1. Shri Ashish Fotedar, National Centre for Cold-Chain Development (**Convener**);
2. Shri P K Mukherjee, (**Co-Convener**);
3. Shri Sunil Jain, M/s Blue Star;
4. Shri S Sapaliga, International Copper Association;
5. Shri Srinivasu M, M/s Voltas India Pvt. Ltd;
6. Shri Aditya Narayan Singh, MoEFCC;
7. Shri Vaibhav Chaturvedi, CEEW;
8. Shri Girja Shankar, Energy Efficiency Services Ltd.;
9. Shri Kiran from Danfoss;
10. Shri V K Arora;
11. Shri Bhavesh Mehta, Reliance Retail Limited;
12. Shri Manmohan K of Carrier (New);
13. Shri Vikas Malhotra of Carrier (New);
14. Shri Gaurav Mehtani of Daikin (New);
15. Shri Manoj Singh of Daikin (New);
16. Shri Anil Mehta of Panasonic (New);
17. Representative from ISHRAE (New); and
18. Shri Venkanna from TRANE.

**MED 03: P23 India Cooling Action Plan**

1. Representative of MoEFCC (**Convener**);
2. Shri Pant of RAMA (**Co-Convener**);
3. Shri V Manjunath from UL;
4. Shri Tholpady from Emerson;
5. Shri Manmohan from Carrier;
6. Shri Vikas Mehta from Chemours India;
7. Shri P K Mukherjee in Personal Capacity;
8. Shri Gaurav Mehtani from Daikin;
9. Shri Srinivasu M from Voltas;
10. Shri Avinash from Honeywell;
11. Representative from ISHRAE; and
12. Shri Shankar Sapaliga from ICA.
13. Representative from M/s Honeywell; and
14. Representative from M/s Copeland

**MED 03: P24 Cooling cabinet made of clay**

1. Shri V. Manjunath, UL India Pvt Ltd (***Convener***)
2. Consumer Electronics and Appliances Manufacturers Association
3. Blue Star Ltd.
4. Shri J. K. Agrawal, In personal capacity
5. Shri S. T. H. Faridi, In personal capacity
6. Voltas Ltd
7. VOICE

**MED 03: P25 Non-ducted Portable Air Conditioners and Heat Pumps**

1. Shri Satish Kumar (Convener);
2. Dr. J Mathur, MNIT Jaipur;
3. Shri Srinivasu, M/s Voltas;
4. Shri Davesh Mudgal, Sierra Aircon;
5. Shri Gaurav Mehtani, M/s Daikin;
6. Shri Rahul Ramtekkar, Johnsons Control Hitachi;
7. Shri Shankar Sapaliga of International Copper Association; and
8. Ms. Sneha Harsora of M/s Blue Star.

**MED 03: P26 Smart Technology (IoT) in Refrigeration and Air Conditioning**

1. Shri V Manjunath of UL (Convener)
2. Shri Shankar Sapaliga of International Copper Association India.
3. Shri. Satish Kumar of UL
4. Shri Kiran Kumar of M/s Danfoss
5. Shri Prabhat Goel of ISHRAE
6. Prof. Vishal Garg of ISHRAE
7. Shri Vasant Kale of M/s Blue Star
8. Shri Sachin Shah of M/s Blue Star
9. Shri Vikas Mehta of M/s Chemours
10. Shri Shrinivasu of M/s Voltas
11. Shri Bharath B K of M/s TUV Rheinland (LITD 27)
12. Shri Muhammed Shameem PV of M/s Toshiba Software (India) Pvt. Ltd. (LITD 27)
13. Shri Sanjeev Chopra of M/s Electropreneur Park (LITD 27 )
14. Shri Amit Kumar Jaiswal of M/s Samsung Electronics (LITD 27)
15. Shri Mahesh Babu A K of M/s Samsung Electronics (LITD 27)
16. Shri Praveen Arora of M/s TATA Communications (LITD 27)
17. Shri Sudhakar Mairpadi of M/s Philips India Limited (LITD 27
18. Dr. Kaushik Saha of M/s Samsung Electronics (LITD 27
19. Shri Mahesh Babu A K of M/s Samsung Electronics (LITD 27)
20. Shri Sudhanshu Mittal of M/s Nasscom (LITD 27)
21. Shri Rahul Ramtekkar of M/s Hitachi
22. Shri Chetan Tholpady of M/s Copeland
23. Representative from M/s Carrier.
24. Dr. Yash Shukla, CEPT University; and
25. Representative from M/s Daikin.

**MED 03: P27 Commercial Evaporative Air Cooler**

1. Shri Srinivasu, Voltas (Convener);
2. Representative of M/s Usha;
3. Shri PK Mukherjee in Personal Capacity;
4. Representative of BEE;
5. Representative of M/s Blue Star;
6. Representative of UL;
7. Representative of Intertek;
8. Representative of M/s Havel;
9. Shri Nishant Gupta of ISHRAE;
10. Dr. Yash Shukla, CEPT University;
11. Representative of M/s Bajaj Electrical;
12. Representative of M/s Godrej;
13. Representative of M/s Symphony Ltd.;
14. Representative of M/s V-Guard;
15. Representative of M/s Orient;
16. Representative of M/s Crompton;
17. Representative of M/s Hindware; and
18. Representative of M/s Kenstar.

**MED 03: P28 Automotive Air Conditioning and Mobile Air-Conditioning**

1. Shri A A Badusha of Automotive Research Association of India, Pune (Convener)
2. Ashok Leyland Limited, Chennai
3. Automotive Research Association of India, Pune
4. Calsonic Kansei Motherson Auto Products Private Limited, Kanchipuram
5. Carrier Air Conditioning and Refrigeration Limited, Gurugram
6. Denso International India Private Limited, Gurugram
7. Hanon Automotive Systems India Pvt Ltd
8. Honda Cars India Research and Development Limited, Noida
9. Honeywell International India Private Limited, Gurugram
10. Indian Institute of Technology Delhi, New Delhi
11. Ingersoll Rand India Limited, Bengaluru
12. International Centre of Automotive Technology, Manesar
13. MAHLE ANAND Thermal Systems Private Limited, Pune
14. MG Motor India Private Limited , Gurugram
15. Mahindra and Mahindra Limited, Mumbai
16. Maruti Suzuki India Limited, Gurugram
17. Refrigeration and Air Conditioning Manufacturers Association, New Delhi
18. Renault India Private Limited, Mumbai
19. Sanden Vikas (India) Private Limited, Faridabad
20. Subros Limites, New Delhi
21. Tata Motors Limited, Pune
22. The Chemours India Private Limited, Gurugram
23. Volkswagen India Private Limited, Mumbai
24. Shri P K Mukherjee, In Personal Capacity
25. Lt Col Santanu Roy, In Personal Capacity

**MED 03: P29 Heat Pump Water Heater**

1. Shri P K Mukherjee (Convener);
2. Representative from Blue Star;
3. Representative from Copeland;
4. Representative from Daikin;
5. Representative from JCI-Hitachi;
6. Representative from ICAI;
7. Representative from Trane Technologies;
8. Representative from UL; and
9. Representative from Voltas.

**MED 03: P30 Service Valves**

1. Shri Srinivasu of Voltas;
2. Shri Shankar Sapaliga of ICAI; and
3. Shri Santosh Kumar of Daikin.

**MED 03:P31 Safety pertaining to refilled AC gas:**

1. Shri Shankar Sapaliga (Convener);
2. Shri V Manjunath of UL;
3. Shri Vikas Mehta of Chemours;
4. Shri Avinash of Honeywell;
5. Shri Chethan Tholpady of Copeland;
6. Shri Jitendra Bhambure of Blue Star;
7. Shri Deepak Baid of Blue Star;
8. Shri Rahul Ramtekkar of JCI Hitachi; and
9. Ms Disha of Daikin.

**MED 03:P32 Cold chain and CO2 trans-critical systems:**

1. Shri Ashish Fotedar of NCCD (**Convener**);
2. Shri Aditya Narayan, MoEFCC;
3. Shri Vikas Malhotra, Carrier India;
4. Shri Chethan Tholpady, Emerson;
5. Shri P K Mukherjee, Personal Capacity;
6. Representative from Tecumseh;
7. Representative from ICE Make Refrigeration Limited, Ahmedabad;
8. Representative from Rinac India Ltd.; and
9. Shri Bhavesh Mehta, Reliance Retail Limited

**MED 03:P33 Testing and calculating methods for seasonal performance factors of air-cooled air conditioners and air-to-air heat pumps**

1. Dr. Jyotirmay Mathur (MNIT Jaipur)
2. Shri Satish Kumar, UL
3. Prof. S. K. Das, Indian Institute of Chemical Engineering
4. Shri Shankar Sapaliga, ICA
5. Shri Harsh Vardhan Pant, RAMA
6. Shri Chethan Tholpady, Emerson and
7. Shri Srinivasu M, M/s Voltas.

**MED 03:P34 Sustainability**

1. Shri P K Mukherjee (Convener);
2. Shri Manish Begad from Blue Star;
3. Shri Gaurav Mehtani from Daikin;
4. Shri Avinash Kumar from Honeywell;
5. Shri Vikas Mehta from Chemours;
6. Shri Satish Kumar from UL;
7. Shri Aditya Anil from LG Electronics.
8. Shri C. M. Pathak of Intertek;
9. Shri Rahul Ramtekkar of JCI Hitachi;
10. Shri Munish Sharma of Carrier;
11. Shri Shankar Sapaliga of ICAI;
12. Representative of Panasonic; and
13. Shri Srinivasu Moturi of Voltas.

**ANNEX 4**

(Item **2.2.7**)

1. Engineers India Limited, New Delhi
2. Mandev Tubes Ltd, Umbergaon, Gujarat
3. Bharat Heavy Electricals Limited, Project Engineering Management, Noida
4. Indian Institute of Technology, Kanpur
5. Usha International Ltd.
6. Climatrol Corporation
7. Gujral Aircon Ltd.
8. Tecumseh Products India Pvt. Ltd.
9. Cool Wings
10. Highly Electrical Appliances India Private Limited

**ANNEX 5**

(Item **3**, Sl No.ii)

**Sample Terms of Reference for R&D project**

1. **Title** : Study on performance cum safety parameters and testing of General Purpose Ball Valves
2. **Background**

Chemical Engineering Plants and related Equipment Sectional Committee, MED 17 of BIS is responsible for drafting standards on equipment used in chemical industry.

BIS has published Indian Standard IS 9890: 1981 for General Purpose Ball Valves which lays down the performance requirements and testing of the ball valves used for general purposes. The document can be accessed on e-BIS website in ‘know your standards’ and the BIS CARE App. This standard is under Voluntary certification.

General purpose ball valves are common types of valves used in a wide range of industrial, commercial, and residential applications. They are designed with a simple yet effective construction that allows for on-off control of fluid flow. Important aspects of general purpose ball valves are safety, quality assurance, interchangeability, compatibility, performance consistency, environmental considerations, global trade and regulatory compliance. Therefore, the Committee has identified the research project for study of general purpose ball valves to revise the above Indian Standard.

The study shall cover various pressure tests such as hydrostatic seat test, shell test and air seat test.

1. **Objective**

To collect data/information and submit analytical reports on performance cum safety requirements, construction, design, materials, energy use and tests as part of this project.

1. **Scope of the Project:**

This project involves study, data collection and preparing report on construction, operation, performance & safety requirements and tests for general purpose ball valves.

It will also include visits to Large & MSME manufacturing industries. Identifying the manufacturing and user base. It will also include identifying the testing facilities available in the country for carrying out the tests.

1. **Deliverables**
2. Analytical reports on performance cum safety and testing requirements of general purpose ball valves, after collecting data from MSME and Large manufacturers including devising a sampling plan for drawl of samples and getting the samples tested from BIS recognized or NABL accredited labs. (also *see* Sl No. 7)
3. Report on the detailed summary of all the discussions with manufacturers, laboratory and user details taken during the visit.
4. Report on import, export data, number of manufacturers, number of laboratories, challenges faced by them and national and international regulations.
5. Sustainable process practiced by the manufacturers like energy resources, energy use, energy efficiency, Practice of 3R’s, waste disposal, carbon footprint.

NOTE - The proposer should collect and rely on the primary data to the extent possible and may also use peer reviewed publication data to support the finding, wherever necessary.

1. **Research Methodology**
2. A thorough literature review should be done for existing international and national journals, study papers and analyse the findings.
3. Visit the manufacturing unit as per the sampling plan and collet the data as mentioned in the scope. During the visit, observe manufacturing process and testing methods. Also, consult with relevant technical personnel.
4. Draw samples from the varieties manufactured and get it tested in BIS approved laboratories for similar product for chemical, mechanical and electrical properties.
5. Visit to NABL Testing laboratories in India. Make report on testing methods, costs and infrastructure required for testing of general purpose ball valves.
6. Contact the relevant organizations, manufacturers, users, importers and exporters for information and data collection. Also, collect information through questionnaires.
7. Report shall be prepared of findings and data collected, discussions as per the deliverables of this project.
8. **Sampling Plan**

A sampling plan has to be devised by the proposer for carrying out factory visits and collecting samples from Industries at various locations all over India.

Sampling Plan Example:

Visit to 2 MSMEs & 3 Large manufacturing site and drawl of 2 samples for testing.

1. **Timelines and Review Process**

The duration of the project is 5 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

|  |  |  |
| --- | --- | --- |
| **Sl.**  **No.** | **Stage** | **Time from date of award of project (cumulative)** |
| 1 | Literature review and identification of manufacturing base, testing laboratories, user/user industry, and discussion with BIS for the finalization of sampling plan | 1 month |
| 2 | Mid-term review on the project progress ( in every) | 1-1.5 months |
| 3 | Visit to manufacturers, testing laboratories, users and importers and exporters and data collection | 2 months |
| 4 | Preparation and submission of first draft report to BIS | 2.5 months |
| 5 | Submission of final project report | 5 months |

Notes ―

The proposer may submit the draft report to BIS without waiting for test report from independent laboratories if the test is of long duration test (> 1 month).

**2** The proposer shall comply to the provisions given in the BIS guidelines for Research & Development Projects for Formulation and Review of Standards, i.e., doc no. **SCMD/R&D Guidelines/20230909**.

1. **BIS will provide on request:**
2. Any national/ international standards (ISO, IEC) relevant to the project
3. Licensee details relating to manufacturing similar products
4. List of BIS approved labs testing similar product
5. **Relevant sectional committee and Nodal officer from BIS**

* **Sectional Committee:**

MED 17 –Chemical Engineering Plant and related Equipment Sectional Committee

* **Nodal officer :**

Ms Neha Thakur, Scientist C/ Deputy Director – Member Secretary MED 17, Email : med@bis.gov.in