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**DRAFT**

# TC/TG/MTG/TRG MINUTES COVER SHEET

**(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)**

TC/TG/MTG/TRG No. 8.4 DATE 02/01/2022

TC/TG/MTG/TRG TITLE Air-to-refrigerant heat transfer equipment

DATE OF MEETING 02/01/2022 LOCATION Virtual (Las Vegas, NV)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MEMBERS PRESENT | YEAR APTD | MEMBERS ABSENT | | YEAR APTD | EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE |
| Arindom Joardar, Chair | 2021 | Zhiwei Huang (Progs. SC) | | 2018 | Vikrant Aute (MTG) |
| Christian Bach, Vice-Chair & (VM) | 2021 | Bill Fox (Stds SC) | | 2020 |  |
| Kishan Padakannaya (Research SC Chair) | 2021 |  | |  |  |
| Kashif Nawaz (HandBook SC Chair) |  |  | |  |  |
| Pratik Deokar (Webmaster) | 2021 |  | |  |  |
| Ratnesh Tiwari (Membership SC Chair) | 2018 |  | |  |  |
| Dhruv Hoysall (Secretary) | 2021 |  | |  |  |
| Pedro Perez (VM) | 2020 |  | |  |  |
| Khaled Hassan Saleh (VM) | 2021 |  | |  |  |
| Yang Zou (VM) | 2021 |  | |  |  |
| **DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*** | | | | | | |
| TAC Section Head: Kevin Mercer | | | | SH0804@ashrae.net | | |
| All Committee Liaisons as Shown on TC/TG/MTG/TRG Rosters (Research, Standards, HBs, etc.) | | | | See ASHRAE email alias list for needed addresses. | | |
| Mike Vaughn,  Manager of Research & Technical Services | | | | MORTS@ashrae.net | | |

Note: These draft minutes have not been approved and not the official, approved record until approved by the TC.



1. **CALL TO ORDER and APPROVAL OF MEETING MINUTES**

Arindom Joardar (Chair) called the meeting to order. Introductions (name/affiliations). Arindom requested everyone to sign-in on the Chat. Arindom reminded everyone of the ASHRAE code of ethics. Orlando Annual Meeting minutes approved 5-0-0. Arindom reminded everyone of ASHRAE code of ethics as part of chair breakfast update.

1. **SELF INTRODUCTIONS AND ATTENDENCE:**

Everyone attending introduced themselves via the Chat and attendance recorded. Chair identified 4 (excluding himself) voting members. Quorum was met. Voting member attendance listed on cover sheet. Kashif said he was a voting member and wasn’t listed on ASHRAE’s website. Chair reviewed the agenda with members.

Note – Please reach out to the secretary (Dhruv Hoysall, Dhruv.hoysall@carrier.com) if you recall attending and your name is missed out.

1. **CHAIR’s REPORT (Arindom Joardar)**

Chair presented highlights from the Chair’s breakfast

* + - Introduced chair’s goals, alignment with ASHRAE vision and goals
    - Voting membership needs to improve diversity among voting members (OEM, industry, govt., academia)
    - Acknowledged that there has been a disruption due to the pandemic and the need to improve participation and strengthening of the TC08.04 quorum
    - Reviewed challenges with Meetings/Collaboration in hybrid TC meetings
    - Need update roster; as per TC chair handout, TC chair (Arindom)
    - Presented new research focus: Decarbonization, Electrification and Net Zero to align with ASHRAE’s goals. RAC is tasked with screening and prioritizing proposed research projects based on the current ASHRAE Research Strategic Plan
    - ASHRAE encourages TC’s to maintain a pipeline of future research ideas that can develop into RTARs
    - Two new functional groups: TG2.RAST(Reactive Air and Surface Treatment) and MTG.RES (Resilience)
    - ASHARE introduced new guidelines for conducting virtual interim meetings in addition to the existing bi-annual meeting as necessary. These meetings are intended to be completely online.
    - Reorg update: Restructured website. Nothing that impacts 8.4 significantly
    - Seminar and forum proposals are due by Thursday Feb 17,2022 for next meeting in Toronto
    - Upcoming deadlines for George B Hightower technical achievement award by Sep 1, 2022. Recognizes outstanding achievements
    - Chair presented upcoming ASHRAE conference programs

Detailed report from Chair’s breakfast is appended to these minutes below:



1. **RESEARCH SUBCOMMITTEE REPORT (Kishan Padakannaya)**

**4.1** ***Research subcommittee chair, Kishan Padakannaya, presented a report from the Research Subcommittee Chair’s Breakfast meeting. The highlights are below:***

* + - Kishan mentioned that Omar Abdelaziz is the RAC Vice-Chair and Chris Seeton is section 8 research liaison
    - Annual research budget reduced to $1.8 million and ASHARE eliminated some research grant awards temporarily to cover current contract commitments for ongoing projects
    - In Fall 2021 meeting, ASHRAE strategic research plan has been approved
    - Since Fall 2021 RAC approved 6 RTARS and 5 Work Statements; 3 released for bid
    - Backlog of about 20-25 projects ready for bid
    - 2 year wait time for work statements
    - 17 TRPs that are ready to bid in Spring 2022 onwards
    - 6 new research initiatives introduced
    - PMS and PES training modules are now complete and available
    - New web-based process to submit and track RTARS
    - PMS meetings are now open to public, anybody can attend. Any meeting that occurs outside the conference should be sent to everyone
    - Omar Abelaziz stated that the purpose of monthly PMS meeting is to give higher visibility to research. Research updates etc., those items that are non-confidential. Research promotion via public meetings
    - PMSc chair will decide if meeting will be public or private
    - Slides from the Research Subcommittee Chair’s Breakfast meeting are attached for reference

**4.2 *Programs at Phoenix June 2021***– Seminar 23 (On-demand): Additive Manufacturing of Heat Exchangers. Virtual presentations by Vikrant Aute (U of Maryland), Kashif Nawaz (ORNL) and Kevin Uvodich (UIUC).

**4.3** ***Current Research Projects***

* + - * No active research as lead TC
      * Co-sponsor with TC 8.11 for RP1785 Charge Project
        + Ray Rite (PMS chair), Christian Bach (PI)
        + Update will be given during TC 8.11 research meeting (Jan 26, 2022)
      * Co-sponsor with TC 1.3 for RP1683 Ammonia U-Bend Project
        + Ray Rite (PMS Chair), Chad Bowers (PMS), Dr. Abbas (PI, GIK Institute), Lorenzo Cremaschi (Co PI)
        + Report next summer meeting, alignment on facility and goals
        + Concerns on: Ability to capture data at -40C, some testing will be done in Auburn instead of GIK Institute
        + Update will be given during TC 1.3 / 8.5 research meeting (Jan 30,2022)

**4.4 *Ideas for RTARs***

* + - * Impact of oil return – Sankar started RTAR
      * Low superheat systems – speed of TXV and its interaction with transient response of heat exchanger – Sankar with support from Pedro and Christian (co-sponsor with TC 8.8?) - *Sankar will have RTAR before RAC meeting in September – ID tube/fin coil and OD MCHX scope*
      * Corrosion project follow-up?
      * Model for flow in distributors with focus on modulating flow / variable speed systems Kashif to share literature – *Kishan to follow up with Kashif, Vikrant to help too. Kashif to share info.*
      * Effect of coil damage (manufacturing/install/transport/during use) on performance – Bill Fox - *follow up to fouling, recommendation to when coil replacement needed. Sankar – standard to quantify – Keep for future discussion*
      * ~~Unified testing methods for tubes (aka calorimeter testing) –~~ *~~drop from list~~*
      * Update on market interest in < 4mm diameter tubes [Vikrant, Bill, Yirong] - *keep for prototyping capability to catch up, various tube spacing main issue even with flat fin – Yirong assessment*
      * ~~Characterizing limits for condensate blow-off for ID/OD? coils – Yang -~~ *~~drop from list / consider next topic on coil coatings~~*
      * Longevity of coil coatings – Yang - *Yang to share Penn State U research – received, maybe proprietary information, Kashif to share some additional research.*
      * In Orlando meeting Lorenzo suggested to identify gaps in TC 8.4’s handbook sections
        + *Microchannel evaporators basics into handbook (look at Lorenzo’s research also) – Jun and Sankar to have offline discussion*
      * Evaporative condensers - developing correlations – Emily Yin [TC 8.6 lead] - *Information there in Condenser chapter 39*

**4.5** ***New Ideas for RTARs***

* + - ~~Plate fin evaporator application in building HVAC industry [adopting] -~~ *~~Aerospace vs. Automotive – Kishan to look into further~~*
    - ~~Secondary loop systems fin-tube coil sizing study – A2L Refrigerant to Air OD coils > A2L to Glycol HX > Glycol to Air ID coil. Simulation followed by test validation -~~ *~~Tools already exist.~~*
    - ~~Evaporation in Microchannel coils – heat pump applications (do we need more data) –~~ *~~not much interest~~*
    - *Vote in main meeting on co-sponsoring RTAR from Christian (TC 8.08 and this has lots of co-sponsors including TC 1.3, TC 8.11).*
    - *Charge reduction with low GWP fluids – Christian’s idea (system or component level?)*
    - ***Low GWP charge modeling for heat exchanger. Tube plate fin and microchannel. TC 1.3/8.5 can co-sponsor. Christian Bach volunteered – Vikrant can help.***

1. **TAC SECTION HEAD REPORT (KEVIN MERCER)**
   1. None
2. **HANDBOOK SUBCOMMITTEE REPORT (Kashif Nawaz)**
   * + Kashif to continue as Handbook Subcommittee Chair
     + TC 8.4 is responsible for following 4 chapters.
       - Chapter 23 air cooling & dehumidification coils (Fundamentals)
       - Chapter 27 air heating coils (Fundamentals)
       - Chapter 39 condensers (Fundamentals)
       - Chapter 14 Forced circulation in coolers (Refrigeration)
     + Chapters 23, 27 & 39 from Fundamentals HB are due for an update in 2025
     + Urgent: Refrigerant HB chapter 14, no major revisions expected. TC 8.4 Voted to publish as is in this Winter meeting. Christian motioned to publish as is and Khaled seconded. Approved 5-0-0-CV
     + Contact Vikrant directly for any changes
     + Kashif to have a dedicated meeting to start planning for the 2025 updates to the Fundamentals handbook chapters. Omar Abdelaziz, Christian Bach, Khaled Saleh, Vikrant Aute, Amir Joker, Pedro, Lokanath Mohanta volunteered to help with handbook update work
     + Arindom and Kashif reviewed the ASHRAE workflow and guidelines for updating the HB chapters. Kashif will work with volunteers to put the plan together and review progress in upcoming TC meetings. He will set up dedicated meetings as needed.
     + Handbook liaison for each handbook, follows up with individual subcommittee chairs to wrap up changes the year before it is due to be published
     + ASHRAE projects sponsored from any TC that generates new data should be added to the handbooks. Peer-reviewed journal paper also can be used
3. **PROGRAMS SUBCOMMITTEE REPORT**
   * + Previous Programs SC chair Zhiwei Huang has moved on and Pedro Perez volunteered to take on program subcommittee chair role
     + Pratik Deokar, shared updates from 8.5 and 1.3, checked with committee if 8.4 is willing to co-sponsor effort for Toronto,2022. Khaled moves to motion to co-sponsor with 8.5 and 1.3, Pedro Perez seconds. Voted 5-0-0-CV
4. **MEMBERSHIP REPORT (Arindom Joardar & Ratnesh Tiwari)**
   * + 4 voting members, many rolled off in 2021
     + Following volunteered to serve as voting members
       - Kashif Nawaz, Vikrant Aute, Kishan Padakannaya, Pratik Deokar, Matthew Baker, Jun Li and Alfredo Oliveira
     + Chair stated that he will interface with section head and finalize the voting membership roster before the deadline Feb 24th, 2022. The new roster will come in effect on 6/30/2022.
     + Encouraged new participants to join as provisional corresponding members
     + Ratnesh Tiwari to continue as Membership Subcommittee Chair and agreed to serve for 2-3 more meetings
     + Pedro volunteered to take on Programs subcommittee chair role
5. **STANDARDS UPDATE (Bill Fox)**
   * + Responsible for 3 standards
     + Standard 33 is under revision (SPC 33)
       - Open item that needs to be closed
       - Chair to follow up with Bill Fox and include in minutes
     + Vikrant – Updated references and figures for standard 33
     + Chair expects SPC 33 to be very close to being updated
6. **MTG LIAISON REPORT (Vikrant Aute)**
   * + Currently 34 members of the research subcommittee per MTG.LowGWP roster dated 2021-Aug-1 (subcommittee assignments for MTG members).
     + RP-1806 “Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update”. Estimated completion date: next decision point after pilot study, Mar/Apr-2022 (?, not yet certain)
     + Regarding the disposition of results form, this MTG made a referral to SSPC 15 to review results of RP-1807 and RP-1808
     + RP-1855 “Determination of the Impact of Combustion Byproducts on the Safe Use of Flammable Fluorinated Refrigerants”. Revision requests sent to the P.I. on 2021-Dec-7. Revised final report is pending.
     + A new RTAR is under development by TC 8.8 (Refrigerant Systems Controls and Accessories). Proposed title is “Capillary Tube and Short Tube Orifice Performance for Low GWP Refrigerants”. Circulating rough draft of RTAR during annual meeting June 2021 seeking co-sponsorship by other TCs. {no other update available at this time}
7. **WEBMASTERS REPORT (Pratik Deokar)**

Pratik Deokar relayed that the website was up to date.

1. **OLD BUSINESS**

There was no old business to discuss

1. **NEW BUSINESS**
   * + Chair: Have more frequent TC meetings, another meeting between winter and summer conference. Meeting will be online
     + Due to scheduling issues, Chair will make decision on when to meet.
     + Omar suggested, committee level meetings to keep meeting sizes smaller due to the international participants
     + SPC 33, handbook and research SCs to meet separately
     + Only major items communicated in main meeting
2. **ADJOURNMENT**
   * + Committee adjourned after completion of discussions. (Christian motions, Khaled seconds)
3. **ATTENDANCE**
   * + Screen shot of the attending members from zoom meeting is attached below:

