

TC 8.5: Liquid to Refrigerant Heat Exchangers
Minutes ASHRAE 2023 Annual Meeting

1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400
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. TC8.5 DATE 06/26/2023

TC/TG/MTG/TRG TITLE Liquid to Refrigerant Heat Exchangers

DATE OF MEETING 06/26/2023 LOCATION Tampa, Fl

MEMBERS PRESENT	YEAR APPT D	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE	
Adnan H Ayub ('22)	7/1/2018	Khaled Saleh ('25)	7/1/2021	<u>Cor. Members</u>	Arindom Jordar
Nicholas Zupp ('25)	7/1/2021	Andreas Knoepfler ('25) (Int'l)	7/1/2021	Jun Li	Bradley Bock (Int'l)
Proshat Mehdizad ('24)	7/1/2020	Gurunarayana Ravi ('26)	7/1/2023	Druv Hoysall (YEA)	Chris Keinath
Vikrant C. Aute ('23)	7/1/2019	Icksoo Kyung ('24)	7/1/2020	Lokanath Mohanta	
Pedro Perez ('24)	7/1/2020			Joe Huber	<u>Pro Cor. Members</u>
Benjamin Dingel ('26)	7/1/2023			Achim Gotterbarm	Muneeshwaran
Stanislav Perencevic ('23)	7/1/2019			Jim Bogart	Bruno de Carvalho
Pratik S Deokar ('26) (YEA)	7/1/2023			Kishan Padakannaya	
				Christian Bach	<u>Guests</u>
				Stefan Elbel	Harshad Inamdar
				Liping Liu	Syed Angkan Haider
				Kashif Nawaz	Kalyan Boyina
				Satheesh Kulankara	Cesar Romero
				Carl Huber	Rahul Kolekar
DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:					
TAC Section Head: Kevin Mercer, Charlie Henck			SH8@ashrae.net		
Research Liaison: Carl Huber Standard Liaison: Srinivas Katipamula Staff Liaison: Steven J Hammerling Handbook Liaison: Derek Crowe			srinivas.katipamula@pnnl.gov shammerling@ashrae.org derek.crowe@stantec.com		
Mike Vaughn, Manager Of Research & Technical Services			MORTS@ashrae.net		

YEA: Young Engineers in ASHRAE, Int'l: International Members, from outside USA and Canada

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

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1. Monday, February 06, 2022, 2:40 PM. Call to order and reading of TC 8.5 scope (A. Ayub):
 - *TC 8.5 is concerned with the thermal and mechanical design, performance, and application of devices for accomplishing heat transfer between refrigerants (including secondary refrigerants) and liquids.*
2. Introduction of members and guests (in-persona and virtual)
3. ASHRAE Code of Ethics Commitment (A. Ayub)
 - *“Commitment to the ASHRAE Code of Ethics – In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests.*
(See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>)
 - Shared ASHRAE’s Commitment of Health and Safety of the members and conference attendees.
4. Establish quorum requirements (A. Ayub)
 - 8 out of 12 voting members present (5 in-person and 3 virtual), quorum established.

Adnan Ayub (Chair, Handbook) '22	Vikrant Aute (MTG A) '23 (joined the meeting at 3:25pm)	Andreas Knoepfler '25 (not present)	Benjamin Dingel '26
Nicholas Zupp (VC) '25	Pedro Perez (Webmaster) '24	Icksoo Kyung '24 (not present)	Khaled Saleh '25 (not present)
Proshat Mehdizad (Program) '24	Gurunarayana Ravi, '26 (not present)	Stanislav Perencevic '23	Pratik Deokar (secretary) '26

- Shared e-mail aliases of subcommittee chairs in presentation.
5. Review/approve minutes from previous meeting with corrections (A. Ayub)
 - Motion to approve minutes made by N. Zupp
 - Seconded by P. Perez
 - The vote was 7-0-0-5
 - P. Deokar to correct dates in last meeting minutes, and Pedro will update the document on website.
 6. Handbook subcommittee report (A. Ayub)
 - The deadline to edit chapter 39: Condensers and chapter 42: Liquid Coolers (for 2024 version) is 31st July 2023
 - Will need a final vote by July 24th to help prepare and send the Chapter Approval Checklist before the deadline
 - The chapter edits can be done only through authoring portal (authoring.ashrae.org), and is suggested to leave the Track Changes on whenever possible
 - The editor needs to have Microsoft email account to make edits in the portal
 - Jeri Alger has given access to few members
 - Slides will be sent out after the meeting with instructions on making the edits
 7. Program subcommittee report (P. Mehdizad)
 - ASHRAE Annual 2023, Tampa, has 7 Tracks
 - TC 8.5 sponsored Seminar 'In-Tube Flow Evaporation and Condensation Performance of Low GWP Refrigerants' was selected for the Tampa 2023 Annual conference, and the seminar took place on Sunday June 25th, while a good number of audiences attended this seminar
 - Deadline for Winter 2024 submission is August 2nd for Program proposals, and there are total of 9 tracks
 - Next ASHRAE Winter Conference is on Jan 20-24, 2024, in Chicago, IL
 - P. Deokar discussed three potential speakers who could present in a seminar with tentative title 'Heat Transfer with Innovative Novel Surfaces: Latest Developments in Heat Exchanger Devices'. This

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seminar was supposed to be submitted for 2023 Annual Conference in Tampa, with TC 1.3 as main sponsor, but was not submitted as only one speaker was available. The presentation topics fall in the scope of TC 8.5, so was discussed. The information of three speakers are;

- a. Dr. Vikrant Aute (University of Maryland) on Triply Periodic Minimal Surfaces
 - b. Dr. Norihiro Inoue (Tokyo University of Marine Science and Technology, Japan) on Diffusion bonded micro channel heat exchanger, and
 - c. Dr. Hitoshi Asano (Kobe University, Japan) on Diffusion bonded micro channel heat exchanger.
- Voting on this seminar topic was carried out
 - a. Motion to sponsor the seminar was made by A. Ayub
 - b. Seconded by N. Zupp
 - c. Votes yes with quorum to submit with TC 8.5 as sponsor. The vote was 6-0-1-5
 - d. Same topics will be discussed in TC 1.3 the next day for voting.

8. Standards subcommittee report (J. Huber)

- TC 8.5 is responsible for ANSI/ASHRAE Standard 22, 24, and 181
- Late last fall SPC-22 and SPC-181 revised Standards 22 and 181, respectively, and the revisions were sent out for public review in around January
- No public comments were received, and the standards have moved on to publication
- Waiting on galley proofs for both standards
- TC 8.5, in 2022 Annual Toronto, had voted to revise Standard 24-2019; to withdraw the reference to ASHRAE Guideline 2 and fix out-of-date references
- Reference to ASHRAE Guideline 2 is removed
- Fixing out-of-date references is not possible by simple editorial tool, so paperwork for SPC to revise Standard 24 has been submitted to the ASHRAE Standards Reaffirmation Subcommittee (SRS), and SRS will vote on this Tampa meeting

9. Webmaster report (P. Perez)

- Website is up to date

10. Research subcommittee report (K. Nawaz)

- Update from the Research Sub-Committee Breakfast Meeting
 1. Research Administration Committee (RAC) reviewed 0 RTARs, 6 WS reviewed and only 1 accepted with comments, and there were 4 projects for which 4 contractors were selected
 2. Having 0 RTARs was alarming news, and TC 8.5 should work proactively to put new ideas
 3. There are 5 awards managed by RAC; Grant in Air, New Investigator Award, Homer Addams Award, Service to ASHRAE Research Award, and Innovative Research Grant
 4. This time no nominations were made to Service to ASHRAE Research Award, and this is a place where someone from the TC can be identified and nominated
 5. Further the nomination must go through point system and voting system
 6. 20 graduate students, out of 43, were awarded the Grant in Aid Award of up to \$10000 and additional \$1500 for paper presentation
 7. New Investigator Award was awarded to Davide Ziviani
 8. Budget of RAC expenditure has been increasing with good trend and has increased by \$0.5M since last society year
 9. The budget which was fixed for past 5-6 years is no longer fixed
 10. The budget on 2- or 3-years projects do not look justified, considering the economic scenarios, so a discussion was made while comparing the increasing base salaries of mechanical engineers, with a goal to answer how the additional cost in budget can be justified

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11. One proposal was to justify the increase in project budget by cost share, where the bidder would seek additional support beyond ASHRAE
12. Source of cost share was not well defined
13. 2-3 years experimental projects have always extended to 4-5 years, because of equipment breaking during experimentation, thus J. Huber suggested to consider such in the ratings
14. K. Nawaz shared form information to nominate for Service to Research Award
15. PMS training for new PMS members will take place in July/August
16. Publication Topic Acceptance Request or PTAR fund non-research projects activities that in the end can result into tangible outcomes like manual, guidelines, or book, which can be purchased at the ASHRAE bookstore

- RTAR and WS
 1. B. Dingel and A. Gotterbarm had submitted an RTAR , 'Condensation heat transfer of novel low GWP refrigerants on enhanced tube bundles including effects of non condensables', and asked for its approval status and next steps
 2. K. Nawaz informed that this RTAR was shared with previous Research Liaison
 3. K. Nawaz will follow up on this RTAR, which is still in the pipeline
- 1800-RP: "Spray Evaporation on Enhanced Tube Bundles with Low GWP Pure Refrigerants and Refrigerant/Miscible Oil Mixtures" (PMS Chair J. Huber; co-sponsor with TC 1.3)
 1. Experimental and modeling work is done, PMS has the final report
 2. L. Cremaschi is working to clear an issue in the report, after which PMS will make their recommendation to TC 1.3 through email ballot
- Other RTARs, WS, and new topics for research
 1. K. Nawaz brought up the topic, but was not discussed due to time limitation

11. Chairman's report (A. Ayub)

- Task force for Building Decarbonization is encouraging TCs to go more towards the decarbonization topic, see www.ashrae.org/decarb
- FG activity worksheets and survey worksheets needs to be submitted by July 27th at 9 pm EDT

12. Section Head comments (C. Henck)

- C. Henck gave information of what should be included in the activity worksheets
- C. Henck is no longer section head after June 30th.

13. Membership subcommittee report (S. Kulankara)

- V. Aute and S. Perencevic will roll off as voting members on June 30th
- K. Nawaz, J. Huber, and D. Hoysall rolling on as voting members from July 1st
- In roster, there are 23 YEA members, and 16 provisional members waiting to become full corresponding members

14. MTG Liaison (S. Kulankara)

- MTG.LowGWP had two meetings since last conference. Last meeting was on Sunday evening in Tampa
- For this conference, MTG.LowGWP had two sponsored seminars, both related to changes to codes and standards for flammable refrigerants
- On Sunday meeting, the MTG.LowGWP voted to co-sponsor a seminar proposed by V. Aute on 'optimization of systems and new refrigerants'

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- The MTG.LowGWP also had a conditional approval of a seminar, for either next winter or annual, on regulations that discuss PFAS and what impacts that can have on refrigerants
- Currently there are 3 ongoing research projects:
 1. RP-1806, Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update
 - Update will be provided on Wednesday 28th June
 2. RP-1855, Determination of the Impact of Combustion Byproducts on the Safe Use of Flammable Fluorinated Refrigerants
 - Project in final stage
 - Draft report will be uploaded on Wednesday 28th June to be available on website
 3. MTG.LowGWP is aware of a project, RP-1879 is an ASHRAE sponsored project by TC 3.1 but not the MTG.LowGWP, on Foamability Properties of LGWP Refrigerant and Oil Mixtures

15. New Business

- No new business was discussed

16. Schedule Next meeting: Monday, Jan 22, 2024– Chicago, IL, USA

- at 2:30 pm

17. Adjourn

- A. Ayub made a motion to adjourn, P. Perez seconded.
- Adjourned at 4:23 EST, vote was 8-0-0-4

Attachments:

A –Meeting Slides



2023 ASHRAE Annual Conference



Tampa, FL | June 24-28, 2023



ASHRAE Technical Committee 8.5 Liquid to Refrigerant Heat Exchangers

Welcome!

We will begin at **2:30 PM EDT**

Welcome! TC 8.5 Liquid to Refrigerant Heat Exchangers



Housekeeping

Audio

- Attendees are muted upon entry
- Do not un-mute your line
- If you are joining via computer and phone line, ensure both are muted

Video

- You are welcome and encouraged to share your webcam
- Be mindful that you are on display! Turn off your video when needed.

Q&A

- Use the chat function to ask questions
- Our speaker will pause throughout the presentation to answer questions from the chat box.



Adnan Ayub

Chair, Facilitator for this virtual meeting

TC 8.5 Call to Order and Reading of Scope

ASHRAE Technical Committee 8.5 Liquid to Refrigerant Heat Exchangers

TC 8.5 is concerned with the thermal and mechanical design, performance, and application of devices for accomplishing heat transfer between refrigerants (including secondary refrigerants) and liquids.



Adnan Ayub
Committee Chair



TC 8.5 Introduction of Members and Guests

Introduction of our members and guests...

- Please give your name and affiliation, and any TC 8.5 committee duties you have.
- In-person attendees will go first
 - Please be sure to note your attendance on the sign-in sheet.
- Online attendees will go next
 - Wait for a brief pause, and then speak. Remember to unmute before speaking, and then mute again after you have finished speaking.
 - Please send an email to TC0805@ashrae.net with subject “attendance 6/26” so we can log your attendance. Make sure the email contains your full name and please indicate if you are a YEA member.



Adnan Ayub
Committee Chair



ASHRAE Code of Ethics Commitment

- Our TC meeting will abide by the ASHRAE Code of Ethics:
- *Commitment to the ASHRAE Code of Ethics – In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests.*
- Full Code of Ethics:
<https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>



Adnan Ayub
Committee Chair



ASHRAE Commitment to Care Statement

ASHRAE is committed to the health and safety of our members and conference attendees.

- Masks may be worn at the individual's discretion. Masks are not required inside the conference hotels but are strongly encouraged.
- Hand sanitizing stations will be positioned throughout the meeting space.
- If symptoms develop, attendees should NOT attend sessions and can join the conference virtually.
- If an attendee tests positive while at the conference, he or she may quarantine at the conference hotel at their own expense and should report the positive test to ASHRAE staff.

View the full Commitment to Care at [commitment-to-care.pdf \(ashrae.org\)](https://www.ashrae.org/commitment-to-care.pdf)



TC 8.5 Establish Quorum – Current Voting Members

- Adnan Ayub (Chair, Handbook) '24
- Nicholas Zupp (Vice Chair) '25
- Pratik Deokar (Secretary) '26
- Vikrant Aute '23
(MTG LGWP Alt 1)
- Andreas Knoepfler '25
- Icksoo Kyung '24
- Minoo Mehdizadeh (Program) '24
- Stanislav Perencevic '23
- Pedro Perez (Webmaster) '24
- Khaled Hassan Saleh '25
- Gurunarayana Ravi, '26
- Benjamin Dingel, '26

Voting Members roll off after June 30 of the year indicated



Adnan Ayub
Committee Chair



Other TC 8.5 Positions

- Satheesh Kulankara: Membership, MTG LGWP representative
- Kashif Nawaz: Research Subcommittee Chair



Adnan Ayub
Committee Chair



TC 8.5 Email Addresses

- Chair: TC0805@ashrae.net
- Vice Chair: TC0805.VCH@ashrae.net
- Secretary: TC0805.SEC@ashrae.net
- Handbook: TC0805.HBK@ashrae.net
- Program: TC0805.PRO@ashrae.net
- Research: TC0805.RES@ashrae.net
- Standards: TC0805.STD@ashrae.net
- Webmaster: TC0805.WEB@ashrae.net

The full list of aliases can be found on the Technical Committees page on the ASHRAE website



Adnan Ayub
Committee Chair



TC 8.5 Handbook

- TC 8.5 is responsible for Chapters 39 and 42 of the ASHRAE HVAC Systems and Equipment Handbook
- Final due for submission: July 31, 2023
 - Will need a final vote by July 24th at the latest to allow time to submit a final; will coordinate via email
- Edits to be done through the authoring portal (authoring.ashrae.org)
 - Been a challenge to get information from Handbook contacts with this transition
 - Jeri Alger has added members for access; confirm if anyone received it.
 - Must have a Microsoft email account
 - Slides of instructions for making edits will be sent out after meeting.

Adnan Ayub
Handbook Subcommittee Chair



TC 8.5 Handbook

- Edits to be done through the authoring portal (authoring.ashrae.org) (con't)
 - Make sure Track Changes are left on whenever possible
- Handbook in pdf version available through the technology portal of ASHRAE (technologyportal.ashrae.org)
- Handbook Liasion (our chapters): Derek Crowe (derek.crowe@stantec.com)



Adnan Ayub
Handbook Subcommittee Chair



TC 8.5 Program

- Hybrid conference, June 24-28
- 7 Tracks with a mixture of live and on-demand sessions, available for 18 months
- Seminars, Paper Session, Forum, Workshop, Round Tables
- Social events:
 - Welcome party
 - Fun run
 - Companion meet & greet
 - Women in ASHRAE
 - Members night out



Minoo Mehdizadeh
Program Subcommittee Chair



TC 8.5 Program

- Tracks:
 - Fundamentals and Applications
 - HVAC&R Systems and Equipment
 - Research Summit
 - Future-Proofing the Built Environment
 - Pathways to Zero Energy and Decarbonization
 - Building Automation and Control Systems
 - Professional Development and Education



Minoo Mehdizadeh
Program Subcommittee Chair



TC 8.5 Program

TC 8.5 submitted programs for Summer 2023

- Seminar session
- Main Sponsor TC 8.5, Co-Sponsorship TC 1.3,8.4, MTG. Low GWP
- In-Tube Flow Evaporation and Condensation Performance of Low GWP Refrigerants
- Sunday, June 25 1:30 PM – 3:00 PM EDT



Minoo Mehdizadeh
Program Subcommittee Chair



TC 8.5 Program

Winter Conference, Chicago, IL, Jan 20-24, 2024

Tracks:

- Fundamentals and Applications
- HVAC&R Systems and Equipment
- Refrigerants & Refrigeration
- Decarbonization & Climate Change
- Hydronic Systems
- Ventilation, Indoor Air Quality & Air Distribution Systems
- Comfort, Indoor Environmental Quality & Energy Efficiency
- HVAC&R Controls
- Project Delivery Methods

 **Minoo Mehdizadeh**
Program Subcommittee Chair

Deadlines:

- **April 24, 2023**
Technical Papers Due
- **June 28, 2023**
Conference Paper Abstract Due
- **July 19, 2023**
Conference Paper Abstract Accept/Reject
- **August 2, 2023**
Programs Proposals Due
- **October 16, 2023**
Conference Papers Due
- **November 8, 2023**
Conference Paper Accept/Reject
- **December 6, 2023**
Conference Papers Final Accept/Reject
Notifications



TC 8.5 Program

Future Programs

- ASHRAE Winter Conference, January 20-24, 2024, Chicago, IL
- ASHRAE Summer Conference, June 22-26, 2024 – Indianapolis, IN

Discussion

- Program Ideas for Future Winter and Summer Conferences



Minoo Mehdizadeh
Program Subcommittee Chair



TC 8.5 Standards

TC 8.5 is responsible for the following Standards:

- ANSI/ASHRAE Standard 22-2018
Methods of Testing for Rating Liquid-Cooled Refrigerant Condensers
- ANSI/ASHRAE Standard 24-2019
Methods of Testing for Rating Evaporators Used for Cooling Liquids
- ANSI/ASHRAE Standard 181-2018
Methods of Testing for Rating Liquid to Liquid Heat Exchangers



Joe Huber
Standards Subcommittee Chair



TC 8.5 Standards

- SPC-22 and SPC-181 have been formed to fix out-of-date references in Standards 22 and 181
(SPC = Standards Project Committee)
- The revisions have been made, and both standards were sent out for public review this past spring
- There were no comments on either standard during the public review period, so both standards have moved on to publication
- We are waiting on galley proofs for both standards



Joe Huber
Standards Subcommittee Chair



TC 8.5 Standards

TC 8.5 voted to revise Standard 24-2019 to correct:

- Remove normative reference to ASHRAE Guideline 2 (Engineering Analysis of Experimental Data)
 - Guideline 2 has been withdrawn, and Guidelines should not be referenced normatively, since they suggest practices and procedures, not mandate them
- Fix other out-of-date references
- The request to form an SPC to revise Standard 24 has been submitted to the ASHRAE Standards Reaffirmation Subcommittee (SRS). The request should be approved at the Tampa meeting.



Joe Huber
Standards Subcommittee Chair



TC 8.5 Webmaster

- **TC 8.5 Website is up-to-date:**
 - TC Meeting Schedule ✓
 - Tampa Meeting Agenda ✓
 - Atlanta [Draft] Meeting Minutes ✓
 - Seminar 17 Schedule ✓



Pedro Perez
Webmaster



TC 8.5 Research



Kashif Nawaz
Research Subcommittee Chair



TC 8.5 Membership

Membership Housekeeping

- Aute, Perencevic rolling off as Voting Members (VM) after June 30
- Three voting members will roll on as of July 1st:
 - Joe Huber
 - Kashif Nawaz
 - Dhruv Hoysall



Satheesh Kulankara
Membership Subcommittee Chair



TC 8.5 Membership

Provisional Corresponding Members

- Membership will expire
- Please send email ASAP if you wish to become a Corresponding Member
TC0805@ashrae.net



Satheesh Kulankara
Membership Subcommittee Chair



Low Global Warming Potential Multidisciplinary Task Group



Satheesh Kulankara
MTG Representative



TC 8.5 Chair Report

- Task force for Building Decarbonization (TFBD)
 - Encouraging TC's to go for decarbonization
 - www.ashrae.org/decarb
- FG activity worksheets and survey worksheets need to be submitted by the Chair
 - Current form **MUST** be used (not one from Winter)
 - Each subcommittee chair will need to provide information necessary
 - Quick discussion with each subcommittee chair in the meeting
 - Submission for both worksheets by Tuesday, July 27th at 9 p.m. EDT



Adnan Ayub
Committee Chair



Concluding Remarks

- **Schedule Next meeting:**
Monday, January 22, 2024, Chicago, IL
- Adjourn



Adnan Ayub
Committee Chair

