



1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400

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 1/30/2022

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

DATE OF MEETING 1/30/2022 LOCATION Las Vegas, NV

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE	
Joseph B Huber ('22)	7/1/2020	Adnan H Ayub ('22)	7/1/2018	<u>Cor. Members</u>	<u>Prov. Cor. Members</u>
Minoo Mehdizadeh ('24)	7/1/2020	Evraam Gorgy ('22)	7/1/2018	Steven J. Eckels	Lokanath Mohanta
Vikrant C Aute ('23)	7/1/2019	Andreas Knoepfler ('25)	7/1/2021	Masoud Khadem	
Pedro Perez ('24)	7/1/2020	Khaled Saleh ('25)	7/1/2021	Michael Wilson	<u>Guests</u>
Icksoo Kyung ('24)	7/1/2020			Kishan Padakannaya	Macey Parrott
Stanislav Perencevic ('23)	7/1/2019			Autin Armstrong	Biswajit Mitra
Nicholas Zupp (25)	7/1/2021			Ben Dingel	Benjamin Heysor
				Pratik Deokar (YEA)	Sugun Tej Inampudi
				Jun Li (YEA)	Harshad Inamdar
				Kashif Nawaz	Tiffany Liu
				Guru Ravi	
				Steve Trimble	
DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:					
TAC Section Head: Kevin Mercer			SH8@ashrae.net		
Research Liaison: Christopher J Seeton Standard Liaison: Srinivas Katipamula Staff Liaison: Steven J Hammerling			cseeton@shrieve.com srinivas.katipamula@pnnl.gov shammerling@ashrae.org		
Mike Vaughn, Manager Of Research & Technical Services			MORTS@ashrae.net		

TC 8.5: Liquid to Refrigerant Heat Exchangers
ASHRAE 2022 Winter Meeting

1. Monday, Jan 31st 2021, 2:30 PM – 4:30 PM US PST Call to order and reading of TC 8.5 scope (J. Huber):
 - *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
3. ASHRAE Code of Ethics Commitment (J. Huber)

“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>)
4. ASHARE Commitment to Care (J. Huber)
 - *The health and safety of all ASHRAE conference attendees is a top priority. Out of respect for our fellow attendees, we commit to wear masks indoors, monitor our health, seek medical attention if symptoms development and adhere to all ASHRAE Commitment to Care protocols. We are committed to the well-being of one another.*
5. Establish quorum requirements (J. Huber)
 - Quorum: 4 voting members are present, 3 are on line, quorum is established with 7 of 11 voting members present
 - Shared e-mail aliases in presentation
6. Review/approve minutes from previous meeting (J. Huber)
 - No Comments
 - Vikrant made motion to approve minutes
 - Pedro seconded
 - No objections or comments on minutes, approved by all members
7. Section Head comments (K. Mercer)

TC Chairs breakfast was yesterday

 - Theme was trying to align the activities of ASHRAE down to the group level
 - In order to achieve this ASHRAE is trying to eliminate waste in ASHRAE processes
 - A goal of TAC is to make sure that all members are engaged and aware of what ASHRAE is about
 - The reason for the yellow hat worn by most TAC members
 - We need to think about what we are here for and how it aligns with the purposes of ASHRAE
 - TAC oversees all functional groups in ASHRAE
 - Responsible for the MOP for each committee
 - Expects that ASHRAE will continue to have options for in person, on-line and hybrid meetings
8. Liaison comments
9. Membership subcommittee report (S. Kulankara)
 - 2022 roster review, after June 2022 meeting
 - For Society Year 2022-2023
 - Adnan Ayub to become Chairman
 - Nick Zupp to become Vice Chairman
 - Pratik Deokar to become secretary
 - Rolling from Voting Member to Corresponding Member for Society Year 2022-2023
 - Joe Huber

TC 8.5: Liquid to Refrigerant Heat Exchangers
ASHRAE 2022 Winter Meeting

- Rolling to Voting Member for Society Year 2022-2023
 - Evraam Gorgy
 - Ben Dingel
 - Pratik Deokar
 - Gurunarayana Ravi
- Rolling from Provisional Corresponding Member to Corresponding Member
 - Lokanath Mohanta
 - Austin Armstrong
- 10. Handbook subcommittee report (A. Ayub)
 - Systems and Equipment: Condensers, Liquid Coolers
 - No new news, chapters in good shape right now
- 11. Program subcommittee report (M. Mehdizadeh)
 - Winter 2022
 - Hybrid
 - Main sponsor of Seminar on Novel Heat Exchangers Enabled by Shape Optimization and Additive manufacturing
 - Next Meeting, Summer 2022, Toronto Ontario, Canada
 - Deadline for Abstracts is February 17, 2022
 - Extended Abstract Paper Due February 17, 2022:
 - Conference and Technical Paper Final Accept/Reject Notifications February 18, 2022
 - Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due February 22, 2022
 - Extended Abstracts Accept/Reject Notifications March 18, 2022
 - Debate, Panel, Seminar, Forum, Workshop Accept/Reject Notifications April 01, 2022
 - Seeking ideas for seminars or other sessions
 - Motion to co-sponsor seminar - Minoo
 - Thermal and Hydraulic Performance of Low GWP Refrigerants Under Flow Condensations
 - Nick Zupp seconded
 - No objections to sponsoring, motion passed unanimously
 - TC 1.1 is planning a presentation on properties of Low GWP Refrigerants
 - May be co-sponsored by TCs 1.1, 1.3 and 8.5
 - 2023 Winter Conference in Atlanta
 - Seeking ideas for seminars or other sessions
 - Deadlines for Atlanta 2023
 - Tuesday April 5, 2022 – Conference Paper Abstracts, Technical Papers, and Paper Session Requests Due
 - Tuesday April 26, 2022 – Conference Paper Abstract Accept/Reject Notifications
 - Monday July 25, 2022 – Conference Papers Due – Submitted for Review
 - Tuesday August 9, 2022 – Debate, Panel, Seminar Form, Workshop Proposals Due
 - Monday August 15, 2022 – Conference Paper Abstract Accept / Revise / Reject Notifications
 - Monday August 29, 2022 – Revised Conference Papers, Technical Papers Due
 - Friday September 23, 2022 – Conference Paper Accept / Reject Notifications

TC 8.5: Liquid to Refrigerant Heat Exchangers
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- Monday October 10, 2022 – Debate, Panel, Seminar, Forum Workshop
Accept / Reject Notifications
- Do not know if presentations may be made on-line or only in person

12. Standards subcommittee report (J. Huber)

- Two standards need to be updated; committees formed for
 - SPC-22 Testing of Liquid-to-Liquid Condensers
 - SPC-181 Testing of Liquid-to-Liquid Single Phase Heat Exchangers
- Will move forward with these two in on-line meetings
- Has normative references to ASHRAE Guideline 2 which has been withdrawn
- There are also other outdated references
- Standard 24 re-affirm/revise/withdraw
 - Has normative references to ASHRAE Guideline 2 which has been withdrawn
 - There are also other outdated references
 - Chairs suggestion is to table this until a later meeting since this committee already has two functioning SPCs
 - Committee has taken chairs suggestion to table decision until next meeting

13. Webmaster report (P. Perez)

- Website up to date

14. MTG low GWP Liaison (S. Kulankara) Vikrant Aute alternate reported

- Research project still moving forward
- RTAR by TC8.08 Capillary and Short Tube Restrictors for Short Tube Refrigerants

15. Research subcommittee report (K. Nawaz)

- Update from the Research Sub-Committee Breakfast Meeting
 - Chris Seeton is our liaison
 - Budget is \$2.6M to \$2.7M
 - IS reduced compared to past years
 - Can't consider any unsolicited research projects right now
 - Goal is to keep core function moving forward
 - GIA, NIA and IRG will be delayed for now
 - Fall 2021
 - Approved 6 RTARs and 5 Work Statements
 - Research Strategic Plan may be found on ASHRAE website
 - Described differences between RTARs and Work Statements
 - RTARs are brief documents that describe research
 - Work Statements are detailed descriptions of the research to be done
 - RAC recommends not skipping the RTAR process
 - ASHRAE is planning to purchase software to track the progress and communication on research activity
- TRP-1731: "Heat Transfer Performance of Medium Pressure Lower GWP Refrigerants in a Flooded Evaporator Comprising an Enhanced Tube Bundle" (K. Nawaz)
 - RTAR and WS reviewed, however, during communication it was lost
 - Will be resubmitted to RAC
 - Per RAC meeting minutes the project should have made it to out to bid
- 1800-RP: "Spray Evaporation on Enhanced Tube Bundles with Low GWP Pure Refrigerants and Refrigerant/Miscible Oil Mixtures" (Z. Ayub; co-sponsor with TC 1.3)
 - Research subcommittee met yesterday and reviewed the progress
 - Proceeding on with taken spray evaporation data with R-1234ze(E) and R-1233zd(E)
 - Will be testing both an enhanced condenser and evaporator tube

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- Testing with pure R-1234ze(E) has been completed
- Started testing with R-1233ze(E) and oil
 - Some improvement in oil concentration measurement between samples and continuous measurements is needed
- Initial tests with R-1233zd(E) did not show a normal change with increasing heat flux
 - Investigators will need to look carefully at possibility of non-condensable being present in the test rig
- LGWP condensation on enhanced tube bundles RTAR
 - Has been reviewed by research liaison
 - Goal is to extend the knowledge on new low GWP refrigerants, in condensation
 - Is going slightly beyond past research in that it includes the impact of non-condensable gasses on heat transfer
 - Will also include extending to at higher temperature condensation that is representative of heating applications
 - Recommends including both a medium and low-pressure refrigerant, will need to decide when RTAR reaches the Work Statement level
 - Joe Huber made a motion that the RTAR should be submitted to RAC
 - No objections on-line or in person to motion, motion passed unanimously
- Other RTARs, WS, and new topics for research
 - RTAR in process: Characterization of Heat Transfer in Fluted Tubes
 - Some work was done on this topic in the 1980s with little or no additional work done since
 - Need new ideas for research
 - Two phase flow characterization with additive manufactured surfaces (PEMs)
 - If there are any good ideas, please e-mail the research subcommittee head so they may be presented at the next meeting
- Additional comments from the Research Chairs breakfast
 - Co-sponsorship always helps improve an RTAR's chances of being approved
 - RTARs under \$200,000 are not scrutinized as heavily as those with greater cost

16. Chairman's report (J. Huber)

- Breakfast meeting was Sunday morning
 - Format was different this time
 - TCs, MGs etc. will be expected to evaluate if it will be appropriate to continue as a TC, merge with another TC or dissolve
 - Motion made by Zupp to continue as a TC
 - Seconded
 - No objections to motion on-line, in person, motion carried unanimously
 - It has now been put into the MOP that TCs must have balance
 - Not to be strictly enforced immediately since it is a change
 - Our committee looks to be in good shape, no one group of interests is large enough to control TC's decisions
 - Will include the presentation with the minutes

17. New Business - No new business raised

18. Schedule Next meeting: Monday, Jun 27, 2022, afternoon – Toronto, ON, Canada

- Times are tentative, will plan for a hybrid meeting

TC 8.5: Liquid to Refrigerant Heat Exchangers
ASHRAE 2022 Winter Meeting

19. Adjourn

Attachments:

A – Slide presentation from 2022 Winter Meeting

Welcome! TC 8.5 Liquid to Refrigerant Heat Exchangers

Welcome!

If you are in-person, please do not join the virtual meeting, in order to conserve bandwidth

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

 **Joe Huber**
Chair, Facilitator for this virtual meeting

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.



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.



Joe Huber
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.
- 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 so we can log your attendance. Please indicate if you are a YEA member.



Joe Huber
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.*
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Joe Huber
Committee Chair



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Joe Huber
Committee Chair



ASHRAE Commitment to Care Statement

The health and safety of all ASHRAE conference attendees is a top priority. Out of respect for our fellow attendees, we commit to wear masks indoors, monitor our health, seek medical attention if symptoms develop and adhere to all ASHRAE Commitment to Care protocols. We are committed to the well-being of one another.

View the full Commitment to Care at [ashrae.org/2022WinterCTC](https://www.ashrae.org/2022WinterCTC)

Attachment A to TC8.05 Winter Meeting Minutes

TC 8.5 Establish Quorum – Current Voting Members

- Joe Huber (Chair, Standards) '22
- Vikrant Aute '23
(MTG LGWP Alt 1)
- Adnan Ayub
(Vice Chair, Handbook) '22
- Evraam Gorgy '22
- Andreas Knoepfler '25
- Icksoo Kyung '24
- Minoo Mehdizadeh (Program) '24
- Stanislav Perencevic '23
- Pedro Perez (Webmaster) '24
- Khaled Hassan Saleh '25
- Nicholas Zupp (Secretary) '25

Voting Members roll off after June 30 of the year indicated



Joe Huber
Committee Chair



Other TC 8.5 Positions

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



Joe Huber
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



Joe Huber
Committee Chair



TC 8.5 Membership

Membership Housekeeping

- Huber, Gorgy rolling off as Voting Members (VM) after June 30
- Huber will roll off as Chair
- Adnan Ayub will roll up to Chair position
- Nick Zupp will roll up to Vice Chair
- Need 2-3 more VMs and a Secretary
 - We are light on academic VMs
 - Cannot have multiple VMs from the same company



Sattheesh Kulankara
Membership Subcommittee Chair



TC 8.5 Membership

Membership Housekeeping

- Ben Dingel, Guru Ravi, Pratik Deokar roll to VM for SY 2022-2023
- Pratik Deokar will become Secretary for SY 2022-2023
- Austin Armstrong will roll from PCM to CM
- Rick Heiden (CM) has asked to be removed from roster
- SY = Society Year

 **Sattheesh Kulankara**
Membership Subcommittee Chair



TC 8.5 Membership

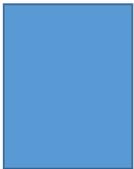
Provisional Corresponding Members

- Membership will expire
- Please send email ASAP if you wish to become a Corresponding Member
TC0805@ashrae.net
- Rick A Larson (1/30/2022)
- Stefano Morcelli (10/25/2023)
- Tabeel Amon Jacob (06/21/2023)
- Austin Armstrong (11/12/2023)
- Neal Lawrence (01/19/2023)
- Lokanath Mohanta (01/19/2023)
- Christopher M Keinath (10/21/2023)

Sattheesh Kulankara
Membership Subcommittee Chair



TC 8.5 Handbook



Adnan Ayub
Handbook Subcommittee Chair



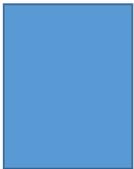


TC 8.5: Liquid to Refrigerant Heat Exchangers

Program Subcommittee Updates

Minoo Mehdizadeh

TC 8.5 Program



Minoo Mehdizadeh
Program Subcommittee Chair



Program Subcommittee Updates



- Hybrid conference, Jan 29-Feb 2
- 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 and walk
 - Members night out

Program Subcommittee Updates



TC 8.5 submitted programs for Winter 2022

- Seminar session
- Main Sponsorship
 - Novel Heat Exchangers Enabled by Shape Optimization and Additive Manufacturing
 - Tuesday, Feb-1st, 11 AM-12:30 PM
 - Neopolitan III/IV

Program Subcommittee Updates

Summer Conference, Toronto, ON, Canada Jun 25-29, 2022

Tracks:

- Fundamentals and Applications
- HVAC&R Systems and Equipment
- Research Summit
- Connected Buildings, Connected Communities
- Cold Climate Building System Design, Operation and Resilience
- IAQ, Energy Use, Comfort and Health of Sustainable Buildings
- Professional Development and Education
- Buildings in the Aftermath of COVID-19

Deadlines:

- Feb 17, 2022
Extended Abstract Paper Due
- Feb 17, 2022
Program Proposals Due
- Feb 18, 2022
Conference Papers Accept/Reject
Notifications
- March 18, 2022
Extended Abstracts Accept/Reject
Notifications
- April 1, 2022
Programs Accept/Reject Notifications

Program Subcommittee Updates

Future Programs

- ASHRAE Summer Conference, June 25-29, 2022, Toronto, ON
- ASHRAE Winter Conference, Feb 4-8, 2023, Atlanta, GA

Discussion

- Program Ideas for Summer 2022 and Winter 2023

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 SPC membership was approved by ASHRAE in October 2021
The SPCs will conduct on-line meetings, tentatively in February



Joe Huber
Standards Subcommittee Chair



TC 8.5 Standards

Standard 24-2019 is due for re-affirmation, revision, or withdrawal.

Both Standards:

1. Normatively reference ASHRAE Guideline 2
(Engineering Analysis of Experimental Data)
 - A. Guideline 2 has been withdrawn, but is still for sale in the ASHRAE bookstore
 - B. Guidelines should not be referenced normatively, since they suggest practices and procedures, not mandate them
2. Have two other out-of-date references



Joe Huber
Standards Subcommittee Chair



TC 8.5 Standards

Item 1 requires revision, and cannot be fixed by ASHRAE Standards Revision Subcommittee (SRS); an SPC must be formed.

TC 8.5 can:

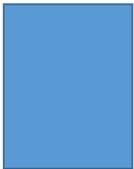
- Re-affirm Standard-24 as-is
- Recommend that ASHRAE form a Standards Project Committee to revise the Standards
- Table the matter until the next meeting



Joe Huber
Standards Subcommittee Chair



Low Global Warming Potential Multidisciplinary Task Group



Satheesh Kulankara
MTG Representative



TC 8.5 Webmaster



Pedro Perez
Webmaster



TC 8.5 Research



Kashif Nawaz
Research Subcommittee Chair



Confirmation of TC 8.5 Continuation

From TC Manual of Procedures

1.5. Review

1.5.1. Once a year, preferably at, or prior to, each Annual meeting, the Committee Chair and Committee Membership shall evaluate their progress in accomplishing the purpose for which they were constituted and recommend one of the following actions to their Section Head:

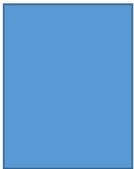
- a) Continue as a TC, TG, MTG, or TRG
- b) Convert from a TG to a TC
- c) Convert from a TRG to a TG or TC
- d) Merge with a TC/TG/TRG and submit a revised scope for the merged committee
- e) Dissolve the TC, TG, MTG, or TRG.



Joe Huber
Committee Chair



TC 8.5 Chair Report



Joe Huber
Committee Chair



Concluding Remarks

- **New Business:**
 - Does TC 8.5 need a Basecamp site?
- **Schedule Next meeting:**
Monday, Jun 28 2021, 4:15 PM to 6:30 PM – Phoenix, AZ ???
- Adjourn



Joe Huber
Committee Chair

