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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. 1.3 DATE June 25, 2024, 1-3 ET, LOCATION Indianapolis, IN

TC/TG/MTG/TRG TITLE Heat Transfer and Fluid Flow

1. Call to Order (Derby)

Melanie Derby called meeting to order at 1:01 PM EDT

2. Introduction of members and guests

Bruce Nelson – Liaison between CEBD tech council and RAF

MEMBERS PRESENT	END YEAR	MEMBERS ABSENT	END YEAR	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Michael Wilson	2026	Omar Abdelaziz	2024	Pentao Yang
Vikrant Aute	2027			Stanislav Perencevic
Lorenzo Cremaschi	2024			M Muneeshwaran
Pratik Deokar	2025			Bradley BOck
Melanie Derby	2026			Justin Kauffman
Stefan Elbel	2027			Abdullahi
Achim Gotterbarm	2026			Jun Li
Joe Huber	2027			SA Sherif
Icksoo Kyung	2025			Kashif Nawaz
Gurunarayana Ravi	2026			Kalyan Boyina
Raymond Rite	2024			Sugun Tej Inampudi
Lingnan Lin	****			Cheng-min Yang
				Bruce Nelson
				Min Che
				Tyler Stiles
				Kishan Padakannaya
				Satheesh Kulankara
				Ben Dingel
				Andreas Knoepfler
				Michael Petersen
				Man-hoe Kim
				Getu Hailu
				Pedro Perez
				Chris Haws
				Harshad Inamdar
				Sudharshan Anandan

3. Establish quorum requirements (Derby)

Quorum has been established.

4. ASHRAE Code of Ethics Commitment (Derby) 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>.)

5. Review of Agenda (Derby)

No comments.

6. Review/Approve minutes from Summer 2023 meeting (Haider)

Vikrant Aute moves to approve the amended minutes. Ray Rite seconds this motion.

Minutes pass unanimously.

7. Section Head Comments

Jason Atkinson – Current roster for the committee is good. Viable until June 30th 2024. See section 9 below for more information.

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TC 9.13 Extra-terrestrial and deep space systems

MTG.BEQ

MTG.GAI

Sh1@ashrae.net – section head email address

8. Liaison Comments

9. Membership Subcommittee (Gotterbarm)

Achim – Omar Abdelaziz, Lorenzo Cremaschi and Ray Rite are rolling off at the end of the month. Ben Dingel, Kashif Nawaz, Linyang Lin, Arindom Joardar to roll on.

Melanie Derby to roll off as Chair

Michael Wilson to roll on as Chair

Kalyan Boyina volunteers for the Vice chair position – Chair approves

Syed Angkan Haider will continue as the Secretary

Satheesh will continue as the Standards sub-committee chair.

10. Handbook Subcommittee (Ravi)

Good participation (~20 people). All the chapter updates were completed on time. 3, 33 did not have any updates. 4-6 had plenty of updates.

There is still some pending work on Chapter 5. Chapters 4 and 6 also have some pending updates. Can be carried on to the next revision.

Please reach out to Guru if you would like to volunteer for the next revision.

11. Program Subcommittee (Deokar)

Seminar 1 on AI/ML – speakers have not confirmed yet. Yoonjin Won and Matteo Bucci may be requested to join the panel.

Seminar 2 on flammable refrigerants – Dr. SA Sherif is available to speak on literature state of the art review. Kashif to follow up with Pratik on this topic.

Panel submitted for last 2024 Winter conference was accepted and Dr. Ohadi presented.

Dr. Ohadi – proposes joint session/seminar with TC9.9 for Orlando – Reliable and efficient cooling of high-performance data centers. Dr. Ohadi to confirm with 9.9.

Kashif Nawaz proposes a program on Brazen plate heat exchangers. Seeking co-sponsorship from TC8.5. TC8.5 to be the main sponsor.

*Ray Rite proposes a seminar on Thermodynamic and transport properties measurement techniques (refrigerant properties). Seeking co-sponsorship from TC1.1 for Orlando 2025. We have a set of speakers willing to present. Could fit into **Track 1 (fundamentals)**. **Track 3 (Refrigerants)**, PCM track, Building track and AI track.*

- Tentative speakers are Sebastian Herman (moist air properties), Dr. Miara (HFO properties), Kyle Glusenkamp from ORNL (phase change materials). Vikrant is looking for one more speaker. Potential speaker from NIST (Mark McIndon, as proposed by Harshad Inamdar).

Bruce Nelson proposes a session on Heat transfer and thermal management of battery energy systems (BESS) – generation of heat from a lithium ion battery at the cell level. Form factor of the cell, shape and packaging are all crucial factors in determining heat dissipation rate. Key topics being, rate of heat generation and thermal runaway. How to suppress or arrest the propagation of thermal runaway. Focus on large stationary systems. Potential co-sponsors – TC9.9?

- Bruce to work to with Pratik to find potential speakers for Jan 2025/summer 2025

- Pratik, Vikrant, Kashif, Bruce to meet and discuss the list of speakers.

12. Status of other current/proposed programs (Deokar)

13. Webmaster (Lin)

The website was recently updated. Meeting information and zoom link have been added to the website.

14. MTG Liaison: Low GWP Refrigerants (Omar Abdelaziz -Liaison, Satheesh Kulankara –Alt#1, Evraam Gorgy–Alt#2)

Satheesh Kulankara – MTG met on Wednesday of the Chicago conference. MTG voted to co-sponsor RTAR for “Condensation heat transfer in tube bundles for low GW refrigerants in the presence of non-condensable gasses”.

RPI806 in process, reports and progress reports to be finished by Spring 2024.

15. Research (Huber)

RP1683 – Vote to change the PMS. Ammonia pressure drop in U-bends project. Going on for 3 years. To be wrapped up at the end of 2024.

TC vote on adding Satheesh to the PMS for RP 1683 and removing Dr. Marios Georgiou.

Marios Georgiou – Ray moves to formally remove him from the PMS. Satheesh to replace him. Joe Huber moves to amend the PMS as stated above. Vikrant Aute seconds the motion. Unanimous positive vote – no nays.

Ray Rite updates – Ahmad Abbas at GIK (Pakistan) completed higher temperature testing (-15°C and +10°C). Ahmad and Lorenzio Cremaschi completed lower temperature testing (-25°C). Experimentation is complete. Working on developing correlations now. No-cost extension lasts until Oct 2024.

- -40°C was the intended target but leaks in the gaskets and the pump limited that effort. -25°C was settled on as the test temperature. We still got plenty of data at three different temperature points.
- Some concerns on the range of the refrigerant quality explored. Likely cause of the limit was the limited equipment capacity.
- Ray Rite to call a meeting with the PMS to review.

Will need an email ballot from the TC after the final report is submitted.

Will need another no-cost extension if the final report is not submitted on time.

RP 1909 (Ray and Kishan) (flue gas – in-tube – heating furnaces for residential application) – Work statement has been accepted.

RTAR – Anti-icing coatings for evaps.

Joe Huber - What is the connection to ASHRAE? How is the IP generated going to be distributed?

Melanie Derby - What is durable and how is it going to be evaluated?

Bruce Nelson - Fouling on these surfaces?

How do we improve the RTAR to make this more relevant to ASHRAE?

Proposal to develop a technology that is commercially available. ASHRAE typically does not develop technology.

Maybe changing the approach from development to investigation of coating technologies would be more appropriate.

- Categories of coatings
- Study mass transfer
- Examine applicability of the Lewis Analogy in frosting conditions with specially designed surfaces.

Joe Huber makes a motion to co-sponsorship this RTAR. Motion dies for the lack of a second. Revisions suggested for the RTAR.

RAC activity

- *Research activity is not large. Plenty of opportunity for new RTARs. 3 RTARs were presented - 2 accepted, 1 returned with comments.*
- *20 grant in aids were approved.*
- *RAC has approved to potentially release 6TRPs for bid this fall if ready.*
- *RAC funding approval limit has been increased from \$250K to \$350K.*
- *New investigator award goes to Dr. Riley Barta at Purdue. (Practical challenges of Zeotropic Mixtures – Carnot vs. Lorenz).*
- *Service to ASHRAE research award – need nominees. Joe Huber to check with ASHRAE to figure out how to nominate people for the award. Form available on the website, due September 1. Can work with the nominees to figure out if they have won the award before or not.*
- *PTAR (Publication Topic Acceptance Request) – PTAR needs to be reviewed by the Publications Committee to assess market need of the publication.*
- *RAC RTAR web tools – Beta testing by 3 RAC members/3 TC members is planned for July 2024. Volunteers are requested for this activity.*
- *Steve Hammerling is the new MORTS.*
- *Work statements – potential bidders should be contacted by the RTAR author before submission.*

New Research

- *Joe Huber has a rough RTAR on flow boiling of propane. Will share this with the committee once it is ready*
- *Kashif and Zahid may have another RTAR in the works – Joe to follow up.*
- *Low GWP and natural refrigerant related work has a lot of interest.*

TC vote on adding Satheesh to the PMS for RP 1683 and removing Dr. Marios Georgiou.

16. Chair Comments (Derby)

Increasing interesting code interactions.

ASHRAE has launched a center of excellence for decarbonization of buildings. Check out the new website!

17. New Business

No comments.

18. Next meeting: Orlando, FL

Joe Huber motions to adjourn at 2:50PM. Mike Wilson seconds the motion.