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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 January 23, 2024, 1-3 ET, LOCATION Chicago, IL

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

MEMBERS PRESENT	END YEAR	MEMBERS ABSENT	END YEAR	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Omar Abdelaziz	2024	Michael Wilson	2026	Ahmed Abbas
Vikrant Aute	2027			Aryan Ahmadpour
Lorenzo Cremaschi	2024			Peter Armstrong
Pratik Deokar	2025			Zahid Ayub
Melanie Derby	2026			Bradley Bock
Stefan Elbel	2027			Kalyan Boyina
Achim Gotterbarm	2026			Min Che
Joe Huber	2027			Ben Dingel
Icksoo Kyung	2025			Ahmed Elatar
Gurunarayana Ravi	2026			Eckhard Groll
Raymond Rite	2024			Syed Angkan Haider
				Yifeng Hu
				Harshad Inamdar
				Arindom Joardar
				Satheesh Kulankana
				Jun Li
				Lingnan Lin YEA
				Muneeshwaran Murugan
				Kashif Nawaz
				Michael Ohadi
				Kishan Padakannaya
				Stanislav Perencevic
				SA Sherif
				Peter Pengtao Wang
				Cheng-Min Yang

1. Call to Order (Derby)

Melanie Derby called the meeting to order at 1:00 CT.

2. Introduction of members and guests

Introductions occurred in the room and for online participants. Chair Derby welcomed guests.

### 3. Establish quorum requirements (Derby)

10 voting members were in attendance at the start of the meeting; quorum was established. Elbel, Cremaschi and Nawaz leave at 2:00 CT.

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)

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

### 7. Section Head Comments (Atkisson)

Handbook subcommittee chair asked to reinforce the dates. Lots of late chapters, sometimes get delayed, Atkisson asked to communicate with handbook liaison regarding the dates. Roster updated and a new roster tool will be available in a few weeks, in February, promises balance in the committee. Strategic plan is through 2025 and confirms that feedback is welcome. TC 1.3 website should be updated, meetings still from Orlando. Atkisson reminded that minutes should be posted and should be indicated as draft minutes unless voted for. Recommended the subcommittee chairs to attend the breakfasts, there is talk about schedules, programs, etc.

Derby asks about rosters not matching. Gotterbarm contacted Tara. Issues with roster tool. New roster update tool, new tool will have ability to preview. Roster update will be done in 2 weeks. Emergency roster update can be requested. Link sent out by Tara. Roster updates take effect July 3, 2024.

### 8. Liaison Comments

### 9. Membership Subcommittee (Gotterbarm)

Rite, Abdelaziz and Cremaschi rolling off. Nawaz, Lin and Ohadi volunteered to roll on. Boyina and Joardar also volunteer to become voting members. Derby asks about industry/academic (i) / (a) balance, Gotterbarm comments that it is heavier on the industry side, 6 (a) / 7 (i). New voting members balance:

Melanie Derby	Chair	voting 06/30/2025 (a)
Michael Wilson	Vice-Chair	voting 06/30/2026 (a)
Gurunarayana Ravi	Handbook Subcommittee Chair	voting 06/30/2026 (i)
Achim Gotterbarm	Membership Subcommittee Chair	voting 06/30/2026 (i)
Pratik Deokar	Program Subcommittee Chair	voting 06/30/2025 (i)
Joe Huber	Research Subcommittee Chair	voting 06/30/2027 (i)
Omar Abdelaziz	MTG.LOWGWP MEMBER-VOTING	voting 06/30/2024 (a)
Vikrant Aute		voting 06/30/2027 (a)
Lorenzo Cremaschi		voting 06/30/2024 (a)
Stefan Elbel		voting 06/30/2027 (a)
Icksoo Kyung		voting 06/30/2025 (i)
Ray Rite		voting 06/30/2024 (i)

Kashif Nawaz		Rolling on 01/07/24 (a)
Lingnan Lin		Rolling on 01/07/24 (a)
Arindom Joardar		Rolling on 01/07/24 (i)
Kalyan Boyina		Rolling on 01/07/24 (i)

#### 10. Handbook Subcommittee (Ravi)

Ravi mentioned TC 1.3 has 5 chapters (3, 4, 5, 6 and 33), and the plan is to update 4, 5, 6. No planned updates for 3 and 33. Derby sent out updates for 4, 5 and 6. Ravi proposes to vote for chapters 3 and 33 since there are no changes. Ravi also proposes discussion on 4, 5 and 6.

Derby proposes to vote on chapters 3 and 33, which don't need any changes. Huber makes a motion, Rite seconds. All 11 voting members gave positive votes. Motion passes for chapters 3 and 33.

Ravi mentions that the deadlines for chapters 4, 5 and 6 are March 29, 2024, April 19, 2024, and May 10, 2024, respectively. Chapters 4 and 6 have fewer updates compared to 5. Ravi discusses the changes.

Huber proposes review and letter ballot since it is difficult to make the reviews on the fly. Ravi proposes the due date for chapter 4 to be the first week of February. Chapter 5 will need more time. Lin, Yang, Ohadi, Derby and Kashif volunteer to review content of Chapter 5. Ravi proposes to take 3 weeks to review chapter 5 and meet after that to confirm agreement on the changes. Derby

requests feedback from the voting members. Handbook subcommittee to meet again in 3 weeks. Pengtao Wang (not part of TC 1.3) also volunteers to review. Ravi agrees to leave the copies of the documents in the portal.

Ravi talks about the criteria for article, conference or other, requests that the author should provide why it needs to be in the handbook. Nawaz says it will all be sorted out in the review process.

Derby talks about more than one correlation for two-phase flows, proposes different options. Ravi comments that deleting existing info will require guidance.

Discussion on surfaces, and it depends on how chapter 4 is organized (Aute).

Chapter 6 will be voted by email ballot (Derby). Ravi recommends an additional week to discuss chapter 6. Melanie says chapter 5 should be reviewed by:

Chapter 4: February 5, 2024

Chapter 5: February 15, 2024 (initial feedback)

Chapter 6: February 22, 2024

Ravi proposes a meeting for the week of February 19, 2024 for chapters 5 and 6. Ohadi proposes more time for chapter 6.

#### 11. Program Subcommittee (Deokar)

Not much to discuss.

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

Deokar confirms there was 1 panel program (panel 4) in the Chicago conference, 1.3 was the main sponsors. Seminars 9 (TC 8.4) and 26 (TC 8.5) were co-sponsored by TC 1.3.

On behalf of TC 8.4, there was another seminar, but it was not accepted. For the next conference, there will be 8 tracks. The deadline is February 26, 2024. Deokar asks for speakers.

Aute suggested a dedicated track for AI applications for more case studies and applications of heat transfer. Ohadi asks to look for people who have demonstrated research and results. The proposed title was: *AI and applications in thermofluids: AI and examples*. Instead of the broad title, *AI/ML applications in thermo-fluids--case studies and examples*. Case examples specifically demonstrating the uses of AI/ML. Derby asked for potential speakers. TC 8.4, 8.5 and 1.13 can potentially co-sponsor. Deokar will reach out to them.

Aute proposes topics on propane and isobutane for heat transfer performance and surface characterization of all sorts of flow channels (plate HXs, microchannels, etc.) could be another seminar.

#### 13. Webmaster (Lin)

Uploaded the previous minutes, new minutes can be uploaded.

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

Abdelaziz didn't attend. Kulankara attended. The MTG had one meeting on Sunday, another on Wednesday. MTG had 2 programs submitted and accepted at Tampa conference, all were well attended. MTG submitted 3 program proposals for Chicago, all were rejected. One of the rejected ones was on PFAS will be resubmitted to Indianapolis conference.

RP 1855 co-sponsored by MTG was wrapped up (combustion by-products), report available on website.

RP 1806 post ignition simulation and risk assessment, has several phases. Phase 1 draft final report is expected in about a month, and after that, PMS will make a recommendation on the future phases.

RP 1884 is co-sponsored by MTG, flammable refrigerant leak detection, initiated in summer meeting in Tampa, more updates coming tomorrow during research subcommittee update of the MTG.

Other aspects are codes and standards, collecting info, more updates coming tomorrow.

MTG chair has asked for opinions on what MTG should do in the future. It has been focused primarily on research. In the past funds from DOE, etc. but the effort is winding down now with only one project still active. Other things are also within official scope like LLC. Discussions will happen over email.

#### 15. Research (Huber)

First vote regarding RP 1800, spray evaporation project (Cremaschi) is complete. Final report was submitted to PMS, some changes requested and made. PMS approved, 4-0-0, and 1 no response. PMS recommended to TC that the report be approved.

Elbel makes a motion, Dingel seconds. 10 in the room say yes, 1 absent, Cremaschi abstains (conflict of interest).

Ahmad requests for extension of 3 months, completed experiments, further tests needed. The write up is not completed. Papers, thesis and report writing will need more time. Cremaschi requests more time at Auburn as well. Cremaschi requests up to June, asks for 6 months to complete the work, and the final draft. 6 months were provided (October 31, 2024).

Rite makes motion for no cost extension through October 31, 2024, Elbel seconds. 11 in favor, Cremaschi abstains due to conflict of interest.

For WS 1909, Rite and Padakannaya updated. Padakannaya submitted it with conditional approval. Comments were to elaborate task and scope, specifically details of flow rates, geometry, etc. Rite pointed out that it is all described in the milestones. Budget was increased by \$50,000.

Huber makes motion to approve the WS as revised by Rite and Padakannaya with the correction of the typo in milestones, Aute seconds. Huber amends the motion to approve the WS with the

correction of the typo in the milestones. Elbel abstains (listed as potential bidder). 9 votes in favor, 9-0-1.

Comments from research breakfast:

Huber mentioned that there was no backlog for funding projects, no queue. All of the awards are being fully funded. Budget is \$5.5 million for the society year. RAC is putting together better cost and budget guidelines to help TCs come up with budgets for the research projects. Huber encourages co-funding and a better list for potential bidders. RAC to invoke a procedure with only one automatic re-send if not bids are received the first time a WS is sent out. If a project comes out with no bids, TC should take the initiative to contact bidders on the initial list and find out why they didn't bid. This could bring more bids the second time.

Finances: RAC can fund projects worth up to \$350,000 on their own, tech council can approve up to \$500,000 and anything above this will go to the board of directors. Presentation on project evaluation and subcommittee meeting will happen soon. Any deliberations that the PES and TC have about RPs are strictly confidential and should not be discussed.

RP 1683: research review meeting was done, there was good turnout.

Rite: Ahmad gave a thorough presentation of data obtained at GIK, well received, and is getting to flow visualization. They found some interesting results on pressure drop measurements. Requirement for -40°C evaporation temperature data, they can do it at GIK but will be done at Auburn. They went through different processes with ammonia leaks. But they worked through all of that, and they will get the data in the next few weeks. No cost extension was done.

Membership of the PMS for the project: Rite is the chair, Chad Bowers (representative from co-sponsor TC 8.4), mentions Nawaz, Bruce Nelson are voting members active and left with 3 voting members. Rite asks Satish joins as voting member of PMS. Rite proposes Satish formally joins PMS. WS to come from Rite and Padakannaya. Arindom volunteers, so it will Ray, Satish, Aute and Joardar.

RTARs

Brainstorming for research projects during the meeting on Sunday, new WSs are being looked for. Zahid and Nawaz will work on it. There was discussion on risk regarding propane as a refrigerant in HPs for rooftop units. Huber will pursue shell side heat transfer of hydrocarbons. Other topics?

Radiant heat transfer topic? Forrest Meggers from Princeton had some ideas.

## 16. Chair Comments (Derby)

Notes from chair's comments: Global standards, decarbonization guides, etc. There are a lot of opportunities. Statistics: 91 programs accepted out of 177 submitted. ASHRAE is seeking input and feedback on the next ASHRAE strategic plan. 3 members are rolling off. Derby expressed how research coming back is a great change.

## 17. New Business

None.

18. Next meeting: Indianapolis, IN

Rite makes a motion to end the meeting.

19. Adjourn 2:58 PM CT.