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### TC/TG/MTG/TRG MINUTES COVER SHEET

TC/TG/MTG/TRG No. TC 8.5 DATE 11/7/2018

TC/TG/MTG/TRG TITLE: LIQUID TO REFRIGERANT HEAT EXCHANGERS

DATE OF MEETING JUNE 25, 2018 LOCATION HOUSTON, TX, USA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE	
Satyam Bendapudi	07/01/2016	John Thome	07/01/2016	Nicholas Zupp	
Sankar Padmanabhan	07/01/2015	Yang Zou	07/01/2016	Vikrant Aute	
Steven Eckels	07/01/2015	James Bogart	06/30/2021	Andreas Knoepfler	
Joseph Huber	07/01/2016			Pedro Perez	
Zahid Ayub	07/01/2014			Ratnesh Tiwari	
Benjamin Dingel	07/01/2014			Clint Finstad	
Lorenzo Cremaschi	07/01/2016			Rony Cherian	
Achim Gotterbarm	07/01/2017			Minoo Mehdizadeh	
Michael Wilson	07/01/2017			Pega Hrnjak	
Satheesh Kulankara	07/01/2016				
Kashif Nawaz	07/01/2017				
<b>DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:</b>					
TAC Section Head: Dustin Meredith			SH8@ashrae.net		
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)					
Mike Vaughn, Manager Of Research & Technical Services			MORTS@ashrae.net		

1. Meeting called to order by chair Satyam Bendapudi at 4:16 PM. The scope of the TC was read by the chair. There were 21 attendees at the meeting. The attendees introduced themselves. Chair reminded the attendees of the ASHRAE Code of Ethics.
2. Establishment of Quorum
  - The following voting members were present at the meeting: Satyam Bendapudi, Satheesh Kulankara, Sankar Padmanabhan, Steven Eckels, Joseph Huber, Achim Gotterbarm, Zahid Ayub, Lorenzo Cremaschi, Benjamin Dingel, Kashif Nawaz, Michael Wilson
  - 11 out of 14 voting members were present, establishing quorum.
3. Review/approve minutes from previous meeting
  - The meeting minutes from the Winter 2018 Chicago meeting were reviewed. There was one correction to the attendance status of Kashif Nawaz
  - Steve Eckels moved to accept the draft minutes with the correction to the attendance status. Joseph Huber seconded. The minutes were approved 11-0-0-CV by the TC voting members.
4. Chairman's reports/comments
  - Satyam Bendapudi attended the Chair's breakfast and provided comments that are summarized below
    - ASHRAE members cannot submit comments to standard setting bodies on ASHRAE letterhead. ASHRAE letterhead is only for use for ASHRAE's official comments that need to follow a prescribed procedure for approval.
    - 2018-2019 George B. Hightower Award Nominations due to Section Head September 1, 2018 & 2018-2019 Service to ASHRAE Research Award Nominations due to Research Liaison Sep. 1, 2018
    - There is a new MTG – MTG.EBO (Effective Building Operations). The scope of MTG.EBO is to coordinate the activities of multiple TC/TG/TRG and other stakeholders in the area of training and tools to support the operation of buildings to enhance the indoor environment and use energy effectively. The initial MTG.EBO roster are TCs 1.4, 7.3, 7.8 and GPC 1.3.
    - The Historical Committee of ASHRAE has issued a call for papers to be published in the ASHRAE Journal and ASHRAE transactions that focuses on historical technical advances in HVAC&R. The Historical Committee is looking for papers for technical advances after 1920 for a program session during the 2019-2020 meetings.
    - TAC has issued a revised TC MOP (Manual of Procedures)
    - Seminars and Forum proposals for Atlanta meeting are due by August 3, 2018. Conference papers are due July 9, 2018.
    - CEC is requesting suggestions for tracks for future conferences.
    - CES has an immediate need for reviewers and sessions chairs for the Atlanta Winter Conference
    - For the Houston meeting, there are a total of 108 slots available for all types of programs
5. Section Head (Dustin Meredith) Comments
  - Section head did not have any further comments beyond those covered under Chairman's report/comments.

- Section Head recognized Satyam Bendapudi's contributions as the Chair of TC 8.5. The TC appreciated Satyam Bendapudi's contributions and leadership as Chair over the last two years.

#### 6. Membership Subcommittee Report (Satyam Bendapudi)

- Chair Satyam Bendapudi presented a brief report on the TC membership and reviewed roster changes
- TC 8.5 has 80 total members with 14 voting members and 66 non-voting members.
- The changes for the 2018-2019 society year are:
  - Members rolling off as voting members
    - Benjamin Dingel
    - Zahid Ayub
    - Satyam Bendapudi
    - Yang Zhou
  - New voting members
    - Evraam Gorgy
    - Adnan Ayub
    - Kaushik Oza
    - Bryce Moore
    - Ebrahim Al-Hajri as a non-quorum voting member
  - Changes
    - Satheesh Kulankara will be the new TC 8.5 Chair
    - Satyam Bendapudi will be the new TC 8.5 Vice-Chair
    - Bryce Moore will be the new TC 8.5 Secretary
    - All subcommittee chairs will continue in their positions

#### 7. Handbook Subcommittee Report (Sankar Padmanabhan)

- TC 8.5 is responsible for two chapters in the HVAC Systems and Equipment handbook. The next update is 2020. Revised chapters are due by summer 2019. Final version is due in spring 2020
- Handbook Subcommittee chair made a request to the TC members to help change the images of equations in the current version to actual equations for the upcoming version
- A section on the results from TRP-1556 "Characterization of Liquid Refrigerant Flow Emerging From a Flooded Evaporator Tube Bundle" will be included in the chapter on liquid coolers. Steve Eckels volunteered to write the new section. Benjamin Dingel and Satyam Bendapudi volunteered to review and provide feedback on the new section.

#### 8. Program Subcommittee Report (Steven Eckels)

- TC 8.5 members are encouraged to send program proposals to Steven Eckels
- The deadline for seminars and forum for the Atlanta conference (Winter 2019) is August 3
- The deadline for abstracts for conference papers for Kansas City (Summer 2019) is August 21.

- There is a track on Optimization at the Kansas City conference lead by TC 1.13. Topics considered for this track are basics of optimization, optimization during component design and operation
- Currently the conference papers at ASHRAE conferences are not indexed. There was a discussion in the committee on the indexing of conference papers.
- One potential topic for Kansas City conference is a “Back to Basics” seminar on liquid to refrigerant heat exchangers

#### 9. Standards Subcommittee Report (Joseph Huber)

- TC 8.5 is responsible for 3 standards: Standard 22 MOT for water cooled condensers, Standard 181 MOT for liquid to liquid heat exchangers and Standard 24 MOT for rating liquid coolers.
- Standard 24 is undergoing a major revision with a target to have a draft completed by the Houston summer meeting. The revision will follow ANSI guidelines due to changes in the PC MOP. SPC 24 held a meeting during the Houston conference. The SPC is working through the standard aiming for a letter ballot before the Atlanta meeting

#### 10. Webmaster Report (Joseph Huber)

- The approved minutes for the Chicago meeting is needed

#### 11. MTG.Low GWP Liaison (Steven Eckels)

- There are three active research projects underway in the MTG. TRP-1806 is behind schedule due to expanded scope. TRP-1807 and TRP-1808 are nearing completion with the draft reports in the process of being reviewed.
- The MTG has several program items in coordination with Section 3
- The sessions on low GWP held at the Chicago meeting sponsored by the MTG and Section 3 were well attended

#### 12. Research subcommittee report (Kashif Nawaz)

- RAC Updates
  - RAC has conditionally approved 3 work statements since the Chicago meeting.
  - RAC has considered 3 RTARS since Chicago meeting with one accepted, one conditionally accepted and one rejected
- ASHRAE has about 25 awards related to research for students. The deadline for nomination is Mar 1. The student’s advisor/school has to nominate.
- Nominations for service to ASHRAE research award are due by Sep 30
- ASHRAE plans to conduct online training sessions for PES and PMS members. All PES and PMS members are encouraged to attend these sessions
- The deadline for RTARs and WS to be considered by the Atlanta meeting is December 3<sup>rd</sup>.

- RP1677 (Measurement and Prediction of Waterside Fouling Performance of Internally Enhanced Condenser Tubes Used in Cooling Tower Applications)
  - PMS chair Benjamin Dingel provided an updated on the activities within RP1677. The PI provided an updated on the status of the project during the research review meeting. There were also monthly teleconference between the PMS and PI between the winter 2018 Chicago and 2018 Houston meetings. The high fouling potential tests and one set of medium fouling potential tests are complete. The low fouling potential tests are underway. The end date for the low fouling potential tests needs to be decided in consultation with the PMS.
- TRP1800 (Spray Evaporation on Enhanced Tube Bundles with Low GWP pure Refrigerants & Refrigerant/Miscible Oil Mixtures)
  - TC 8.5 is a cosponsor of this project along with TC 1.3
  - The PES for the project are in the process of evaluating the bids received for the project and expect to make a recommendation to ASHRAE after the TC 1.3 meeting
- TRP 1731 (Heat Transfer Performance of Medium Pressure Lower GWP Refrigerants in a Flooded Evaporator Comprising an Enhanced Tube Bundle)
  - RAC returned the WS with comments. RAC proposed a reduction in scope from 3 years to 2 years. WS authors will review the RAC comments. The WS needs to be resubmitted by August and need to align with ASHRAE goals.
- Other topics of interest to the TC for potential research projects
  - The following are a list of topics that the TC finds to be of interest for future research projects. TC members are encouraged to create RTARs for these topics.
  - Shell side condensation with lower GWP refrigerants
  - CO<sub>2</sub> condensation on tubes applicable to cascade systems
  - Evaporation of lower GWP refrigerants in brazed plate heat exchangers
  - Distribution of two phase refrigerants in heat exchangers

### 13. Schedule Next meeting

- Chair scheduled the next meeting for Monday, January 14 from 4:15 PM to 6:30 PM during the ASHRAE meeting in Atlanta. The exact location for the meeting will be published in the meeting guide.