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**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. TC 8.5 DATE 4/6/2018

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

DATE OF MEETING JANUARY 22, 2018 LOCATION CHICAGO, IL, 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	Kaushik Oza	Adnan Ayub
Sankar Padmanabhan	07/01/2015	Kashif Nawaz	07/01/2017	Ratnesh Tiwari	Nicholas Zupp
Steven Eckels	07/01/2015	Michael Wilson	07/01/2017	Veeresh Ayyagari	Vikrant Aute
Joseph Huber	07/01/2016			Andrea Bigi	Stanislav Perencevic
Zahid Ayub	07/01/2014			Andreas Knoepfler	Pedro Perez
Benjamin Dingel	07/01/2014			Gene Havard	Minoo Mehdizadeh
Lorenzo Cremaschi	07/01/2016			Steven Trimble	Evraam Gorgy
Achim Gotterbarm	07/01/2017			Michael Wilson	
Yang Zou	07/01/2016			Bryce Moore	
Satheesh Kulankara	07/01/2016			Rony Cherian	

**DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:**

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

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

1. Meeting called to order by chair Satyam Bendapudi at 4:20 PM. The scope of the TC was read by the acting chair. There were 30 attendees at the meeting. The attendees introduced themselves.
2. Establishment of Quorum
  - The following voting members were present at the meeting: Satyam Bendapudi, Yang Zou, Satheesh Kulankara, Sankar Padmanabhan, Steven Eckels, Joseph Huber, Achim Gotterbarm, Zahid Ayub, Lorenzo Cremaschi, Benjamin Dingel, John Thome, Kashif Nawaz, Michael Wilson
  - 13 out of 13 voting members were present, establishing quorum.
3. Review/approve minutes from previous meeting
  - The meeting minutes from the summer 2017 Long Beach meeting were reviewed and approved without any changes.
  - Kashif Nawaz moved to accept the draft minutes. Benjamin Dingel seconded. The minutes were approved 11-0-1-CNV by the TC voting members. Satheesh Kulankara abstained due to being absent at the Long Beach meeting.
4. Chairman's reports/comments
  - Satyam Bendapudi attended the Chair's breakfast and provided comments that are summarized below
    - 2017-2018 George P. Hightower award recipient is Art Hallstrom from TC 1.6
    - 2017-2018 Service to ASHRAE Research award recipient is Brian Silveti from TC 6.9
    - ASHRAE members can view all of the rosters of all of their committees on the ASHRAE website. The roster information can be found under the "My Membership" tab under "Membership and Conferences" tab on the ASHRAE main web page.
    - The Provisional Corresponding Member (PCM) needs to move to a Corresponding Member as part of committee roster updates within two years of becoming a PCM.
    - 2018-2019 roster update is underway
    - 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 Houston meeting are due by Friday, February 9<sup>th</sup>, 2018
    - CEC has had an ongoing issue with presentations not being uploaded for commercialism review before the conference. There is a 3-strike policy for speakers who do not upload their presentations by the published deadline. If a speaker receives 3 strikes, they will not be able to present for the 2 meetings in the following year.

- For the Chicago meeting, there are a total of 106 slots available for all types of programs
- There is a new 90.1 portal on the ASHRAE website ([www.ashrae.org/901portal](http://www.ashrae.org/901portal)) for the 2016 version of Standard 90.1 including the User's Manual. Sign up before March 15 for a free trial and to preview the software
- There is a new ASHRAE Technology Portal that provides access to ASHRAE Journal articles, research reports, Transactions and Conference papers and Conference Seminars (([www.ashrae.org/technologyportal](http://www.ashrae.org/technologyportal))
- ASHRAE also provides an Authoring Portal ([www.ashrae.org/authoringportal](http://www.ashrae.org/authoringportal)) for multiple authors to review, revise and edit documents.
- ASHRAE Terminology portal is available at [www.ashrae.org/ASHRAETerms](http://www.ashrae.org/ASHRAETerms) for terms related to the built environment

#### 5. Section Head (Dustin Meredith) Comments

- Section head did not have any further comments beyond those covered under Chairman's report/comments.

#### 6. Membership Subcommittee Report (Kaushik Oza)

- Membership subcommittee chair Kaushik Oza presented a report on the TC membership and reviewed the changes to the roster.
- 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
  - New voting members
    - Evraam Gorgy
    - Adnan Ayub
    - Kaushik Oza
    - Bryce Moore
    - Ebrahim Al-Hajri as a non-quorum voting member
  - Changes
    - All subcommittee chairs will continue in their positions
    - Yang Zou will be the new TC 8.5 Chair
    - Satheesh Kulankara will be the new TC 8.5 Vice-Chair
    - Bryce Moore will be the new TC 8.5 Secretary

#### 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
- A new section on spray evaporators will be added to Chapter 42

- Yang Zou volunteered to lead this effort. Satyam Bendapudi and Ben Dingel volunteered to help.
- 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

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

- There were four sessions held along with AHR Expo that were sponsored by MTG.Low GWP of which TC 8.5 is a member.
- There were two sessions at the ASHRAE Chicago conference that were co-sponsored by TC 8.5
- TC 1.13 is proposing a track on optimization for the 2019 Annual conference. The focus of the track is on applying optimization techniques for systems, components and controls. TC 1.13 requested TC 8.5 to co-sponsor this track. Steven Eckels moved a motion for TC 8.5 to co-sponsor the track. John Thome seconded. The motion passed 12-0-0-CV.
- TC 8.5 members are encouraged to send program proposals to Steven Eckels

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

- The new manager for ASHRAE standards is Mark Weaver
- 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.
- Standards 22 and 181 were re-affirmed at the Long Beach summer meeting
- 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.

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

- The approved minutes for the Las Vegas and Long Beach meetings are needed

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

- TC 8.5 is a member of the Low GWP Refrigerants MTG. Steven Eckels is the primary representative of TC 8.5. Satheesh Kulankara is the first alternate representative. 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 underway on schedule.

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

- RAC Updates
  - RAC will add one more project review meeting in May, resulting in a total of four meetings annually
  - RAC is offering training sessions for PMS members

- Completed projects need research disposition form
  - TCs co-sponsoring research projects need to vote for the project and have representation in the PMS.
  - WS need to have milestones included as well as go/no go points
  - RAC comments on RTARs need response from the lead author on how the comments are addressed
- 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 summer 2017 Long Beach and winter 2018 Chicago meetings. Medium fouling potential water tests at 1.6 m/s water velocity are underway. Fouling is continuing to increase after 60 days. PI hopes to see asymptotic leveling off in 30-40 more days. The data presented shows relatively high fouling values. The project requires another 14-16 months of testing. Benjamin Dingel recommended that the TC provide a no-cost extension to the project until the end of the revised project plan. This would require the TC to grant a 2 year no-cost extension, which is longer than typical no-cost extensions. There was extended discussion on the progress of the project and the no-cost extension. Benjamin Dingel proposed a motion to grant a 2 year extension to the project subject to approval by the research liaison and manager of ASHRAE research. Joseph Huber seconded the motion. The TC approved the motion 12-0-0-CNV.
  - 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
    - RAC approved the WS. The WS will go out for bids as the next step
  - 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.
  - 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

13. New Business

- Benjamin Dingel provided an update on the revisions to ASME pressure vessel code.

14. Schedule Next meeting

- Chair scheduled the next meeting for Monday, June 25 from 4:15 PM to 6:30 PM during the ASHRAE meeting in Houston. The exact location for the meeting will be published in the meeting guide.

15. TC meeting adjourned at 6:05 PM