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DRAFT MINUTES
 ASHRAE TECHNICAL COMMITTEE 8.4
 AIR-TO-REFRIGERANT HEAT TRANSFER EQUIPMENT
 NEW YORK CITY, NY
 TUESDAY, JAN 21, 2014

I CALL TO ORDER

Lorenzo Cremaschi, the Chair of TC 8.4, called the meeting to order at **3:30 p.m.**

II SELF INTRODUCTIONS AND ATTENDENCE:

Everyone present introduced themselves, and signed a roster sheet. Lorenzo Cremaschi had identified 7 out of 10 voting members (Lorenzo Cremaschi, Jun Wang, Hyunyoung Kim, Stanislav Perencevis, Omar Abdelaziz, Vikrant Aute, and Yi Qu), which confirmed the quorum. There were also 20 corresponding members and 11 guests in attendance. There were 7 members and guests who were also YEA members. Shenghan Jin, the secretary of TC 8.4, kept record of the meeting.

II ROSTER CHANGE

YiQu will be the new Webmaster
 Shenghan Jin will be the Honor and Award Nomination Subcommittee Chair

III NOTE FROM SECTION HEAD:

The Section Head noticed that some voting members had been constantly absent and may have caused some difficulty for the TC meeting to be in order. Replacement of the roster was suggested.

The Section Head also made a few announcements from the board:

- It was requested for every member to follow the ASHRAE ethics code and pay attention to any conflicts of interest.
- Each year there will be awards for the most outstanding TC within each section. The 2014 New York meeting and 2014 Seattle meeting will count as the first year.
- Active TC should check their bios on ASHRAE website and make sure they are up to date.

The Section Head asked for further questions and offered any assistance if needed.

IV REPORT FROM PROGRAM LIAISON

None at this time

VI MINUTES OF PREVIOUS MEETING

Meeting minutes from the TC 8.4 meeting in Dallas were voted on, and approved by all the Voting members (7-0-1). (All presents voted approval)

VII Chairman's notes on TC chair meeting:

Lorenzo read the minutes from the TC chair handout distributed during the breakfast chair meeting. The relevant minutes are attached below

1. 2013-2014 Hightower Award Recipient – G.D. Mathur, TC 5.5 & TC 5.7

G.D. Mathur has provided technical leadership to TC 5.5 (Air-to-Air Energy Recovery) and TC 5.7 (Evaporative Cooling) for more than twenty years in a variety of positions. He has written and revised both TCs' handbook chapters many times and has never missed a single handbook deadline. In the last four years, Mr. Mathur has been responsible for updating Two-Phase Thermosiphon Loop air-to-air heat transfer technology. When TC 5.5 was considering the elimination of the Thermosiphon section from its chapter in the ASHRAE Handbook, G.D. led the effort to reverse that decision. Mr. Mathur's contributions to ASHRAE technical committees, especially to TC 5.5 and TC 5.7, in the last four years have been exemplary and make him a well deserving recipient of the George B. Hightower Award.

2. Outstanding TC Award – NEW!

TAC has developed a new award call the Outstanding Technical Committee Award. The purpose of the award is to recognize, annually, a single Technical Committee within each TAC Section that has the highest measured performance based on a set of weighted criteria as compared to other TCs within that same Section. The goal of this award is to reward TCs for the behaviors and activities that further the goals of TAC and exhibit excellence in the operation of a technical committee. The criterion used is a point system with values assigned to various metrics and activities, which are collected through an updated TC activity form. The award will serve to heighten TC Chair and committee member awareness of what activities are valued to encourage improved performance, and foster friendly competition between TCs within a Section.

3. YEA/TC Hospitality Sunday Afternoon in New York

Is your TC in search for new members? If so, please plan to attend the Young Engineers of ASHRAE (YEA) / TC Hospitality at the New York meeting on Sunday, 1/19, from 4 p.m. to 7 p.m. in the Petit Trianon room on the 3rd floor of the New York Hilton Midtown Hotel. Food and beverages will be available at this casual gathering as well as ice-breaker games to help get these young engineers of the Society talking with TC representatives at the event.

4. 14-15 Roster update process and process for adding provisional CMs

Remember, the current 2013-2014 roster for your TC, TG or MTG is in effect until after the June meeting this year. The new committee rosters for Society year 2014-2015 will be created based upon the update information that each TC, TG or MTG provides to their section head at **this meeting** by midnight, Tuesday, 1/21/14 and these new rosters will go into effect on July 1, 2014. Please see your section head for the 2014-2015 Roster Update form if you still need a copy.

By now, each TC, TG and MTG chair should have received a PDF & MS-Excel file of their current 2013-2014 roster from their Section Head for distribution to the committee. In addition, each member can view/download all of the rosters of their committees on the ASHRAE Website. Go to www.ashrae.org/MyActiveCommittees and log in (if you have not logged in lately, you might need to set up a new username and password). Make sure everyone on your committee also knows how to access the roster. 1/18/13

The provisional Corresponding Member position is a relatively new position on TC/TG/TRG rosters. This position allows potential new members to be added by staff to the committee roster any time a request for membership is made by an individual. The position has a 2-year term on the committee. Staff will notify the chair and reissue a new roster to the committee any time a provisional member is added. The

TC/TG/TRG chair has the option each year during the regular roster update process to convert provisional CMs that have been active participants on the committee the past year into regular CMs or voting members or drop them. If no action is taken, they will time expire from the roster and be removed by staff.

5. TC/TG/TRG Chair's Training Workshop Reminder

Sunday January 19, 9:45-10:45a in the Sutton Center Room (2nd floor) in the New York Hilton Midtown Hotel. As with the Breakfast meeting, both the Chair and Vice-Chair are expected to attend; attendance will be tracked so that we can assess who has been trained. Bring questions - if you need an answer, it's quite likely others also need the same answer. The main focus of this particular workshop will be the roster update process.

6. Request for each technical committee to briefly review ASHRAE Code of Ethics at start of TC meeting

See the following link for the latest version of the ASHRAE Code of Ethics:

<https://www.ashrae.org/about-ashrae/> A hardcopy of the ethics was also attached to the minutes to the TC chair.

7. Useful TC/TG/TRG/MTG Chair Information and forms on ASHRAE website

Information for TC/TG/TRG and MTG chairs can be found on the Technical Committee page of the ASHRAE website at the following link: <http://www.ashrae.org/standards-research--technology/technical-committees>

The TC/TG/TRG Manual of Procedures (MOP) has been revised to include a new committee type, Multidisciplinary Task Groups (MTGs). MTGs are different from TCs, TGs, and TRGs. The objective of the MTG is to first try to better coordinate and focus the activities of the affiliated TC and non-TC groups (EHC, REF, SSPCs, outside groups, etc) that make-up the MTG on the task for which the MTG was created without duplicating the functions of a TC or TG so that the task can be completed as efficiently as possible. In special cases, MTGs may also be authorized by TAC to assume some TC/TG functions, such as research, if it is deemed necessary to better complete their task assignment.

Since the need, purpose, and progress of each MTG is reassessed and reaffirmed by TAC each year, there are no term limits for the MTG Chair, Vice Chair, Members and Alternates.

8. New MTGs that have been formed

TAC approved the formation of the following new Multidisciplinary Task Group (MTG) at their fall meeting:

MTG.HCDG – Hot Climate Design Guide Development

Scope

MTG.HCDG will coordinate TC/TG/TRG technical activities to help support the technical basis, development, and publication of a "Hot Climate Design Guide." Responsibilities include the development of supporting research, presentations, and content for the "Hot Climate Design Guide" special publication.

The chair of this MTG is Frank Mills.

For more information on this MTG and the six other MTGs, please go to the MTG section on the following web page: <http://www.ashrae.org/standards-research--technology/technical-committees> 1/18/13

If your TC would like to have a voting representative on a particular MTG, please contact the ASHRAE Manager of Research and Technical Services, Mike Vaughn, at MORTS@ashrae.net.

9. TC Representatives on MTGs are now validated by TC Chair via the TC roster update process

TC chairs with voting representatives on a multidisciplinary task group (MTG) will no longer need to submit a letter each year to the TAC MTG Section Head as confirmation that they are satisfied with of their voting representatives on MTGs and wish to appoint them another year to serve on the MTG.

Instead, TC chairs will confirm their MTG representatives as part of the TC roster update process each January.

10. TC members are encouraged to volunteer with CEC to review technical papers for ASHRAE conferences

Provide to your Section Head after each Society meeting a list of qualified volunteers from your TC that are potential Technical Session chairs and reviewers of session papers that are related to TC's scope for use by the Conferences & Expositions Committee (CEC) in developing technical content for future technical programs.

11. CEC proposed or recently implemented technical program changes

TC Program Subcommittee Chair Training in New York

Please notify your program subcommittee chair that CEC will be offering training to them as follows in New York: Tuesday, 1/21, 11:15 a.m. – Noon, Harlem Room, (Fourth Floor) New York Hilton Midtown Hotel.

New Type of Program Created for ASHRAE Winter/Annual Conferences - Workshops

One hour long workshops consisting of first short presentations by subject matter experts and then discussion time with audience can now be proposed by TCs.

Program Focus at Seattle Annual Conference

The Seattle Conference Technical Program addresses broad topics in the application of technology to practice, specific applications in ground source heat pumps, O&M and indoor environmental quality, as well as new reports on research taking place worldwide. Specific program tracks are as follows:

- The Indoor Environment—Health, Comfort and Productivity Track
- The Ground Source Heat Pumps State of the Art: Design, Performance and Research Track
- The Installation, Commissioning, Operation, Maintenance of Existing Buildings Track
- The Refrigeration Track
- The Standards, Guidelines and Codes Track
- Professional Skills Track

The Seattle conference will also host the second annual ASHRAE Research Summit, which will present innovations in HVAC&R research with particular emphasis on high performance building design and its role in a clean energy economy, and brings together researchers to present and discuss the latest research. Researchers will present papers, seminars and forums or participate in panel discussions. Also, highlights on ongoing ASHRAE funded research will be presented.

Authors of some 200 Conference paper abstracts have been invited to submit papers for the Research Summit and Conference.

Seminar and Forum proposals for Seattle are due by Thursday, February 13, 2014. Please visit the following site to site your proposal:

<http://ashraem.confex.com/ashraem/s14/cfp.cgi>

Program Focus at Chicago Winter Conference

The Chicago Conference, January 24 – 28, 2015, has announced a call for papers. Conference paper abstracts are due March 24, 2014. If accepted, written conference papers due July 7, 2014. Technical Papers are due April 14, 2014.

Specific tracks are as follows:

- Systems and Equipment
- Fundamentals and Applications
- Industrial Facilities
- Large Buildings: Mission Critical Facilities and Applications
- Energy Efficiency
- Life Safety
- Design of Energy and Water efficient Systems

□ Hospital Design and Codes

For more information, go to: www.ashrae.org/chicago.

12. Special effort to welcome new members and visitors (potential members) to TC meetings

Potential new members for your committee have been encouraged to drop-by your meeting in New York. As a result, please make a special effort to recognize and warmly welcome all visitors to your meeting – A TC can never have too many willing and able volunteers.

13. ASHRAE xCHANGE

Please check out ASHRAE's new online forum/discussion board service and connect with other professionals in the built environment community on a variety of current discussion topics.

<https://www.ashraexchange.org>

14. Option for TC Subcommittee Meetings via Conference Calls and Web Meetings

More and more TCs are taking advantage of a new Society service that allows TCs to hold subcommittee meetings by phone and/or web. Many TCs are finding this to be a more efficient way for them to conduct subcommittee business and it also allows TC members that can't travel to meetings on a regular basis a way to still contribute to the TC. Such a change can also eliminate potential conflicts with the TC's program sessions at Society meetings. Please pass your conference call/web meeting/webinar requests on to the Manager of Research and Technical Services, Mike Vaughn, at mvaughn@ashrae.org or MORTS@ashrae.net

15. New TAC Presentation template for TC members to use with local Chapter

The new presentation template allows TC members, without a lot of effort, to give a presentation to their local chapter on TAC and the TCs in general and to also customize a few slides with information specific to their own TC or TCs. The template is posted now on the Technical Committee page of the ASHRAE website for download.

16. Employment Discipline added to ASHRAE BIO Online Input Form

A new input field titled Employment Discipline has been added to the ASHRAE online member (BIO)graphical input form and TAC would like all TC members to self-declare their employment discipline prior to the Winter meeting in New York by going to the Members Only section (<https://eweb.ashrae.org/eweb/DynamicPage.aspx?Site=ASHRAE&WebKey=8396a37a-9fc2-4f50-9332-5eebebe73494>) and enter their employment discipline information. The link should take you directly to the screen, which is located under demographics.

You will need your login and password to enter. Employment Discipline is located in the third section. Once you have made the necessary updates, save the changes and logout.

Employment Disciplines:

Academic ; Academic - Professor/Staff ;Academic – Student ;Government and Organizations ;Government - Federal (e.g., DOE, EPA, USDA) ;Government - National Lab (e.g., ORNL, NIST) ; Government - Local (e.g., city or state governments) ;Not-for-Profit Organization (USGBC, Habitat for Humanity, etc.) ;Trade Association (ACCA, SMACNA, etc.) ;Building Industry ;Architect ;Building Owner / Management Firm ;Consultant ;Contractor ;Designer ;Facilities Manager/Operator ;Manufacturing Industry ;Manufacturer ; Manufacturer – Sales ; Manufacturer's Representative; Other ; Model Code Organization ; Retired ; Utility ; Other

Thus far, approximately 25% of TC Members have declared their discipline.

17. E&P Beta Test #5 TC meetings being Held in New York

The 5th beta test of Electronic and Present (E&P) meetings, which allows some TC members to participate in the TC meeting from a remote location electronically, will occur in New York and the following TCs have agreed to participate in this test: TC 1.5, TC 2.2, TC 2.8, TC 4.2, TC 7.9, MTG.ET (RP-1561 PMS), TC 8.8, TC 9.2, TC 9.3 (RP-1603 PMS), and TC 9.9

The chairs of those TCs participating should provide to their Section Head feedback on their E&P meeting experience before TAC meets on Wednesday morning, 1/22.

18. Upcoming Program Dates

Seattle Meeting - June 28-July 2, 2014

- Seattle Seminar and Forum Session Proposals are due February 13, 2014
- Technical Papers final review due February 25, 2014
- All presentation files (PPT) due online – June 2, 2014
- Conference Website: <http://www.ashrae.org/seattle/>

The Conferences and Expositions Committee (CEC) oversees ASHRAE's annual and winter conferences and other specialty conferences and expositions globally. The CEC continually works to improve the conference experience for all attendees. To help keep a "pulse" on the technical issues facing professionals in the HVAC&R marketplace, the CEC seeks ideas for tracks for the Chicago meeting next year and annual and winter conferences beyond as well as topics for specialty conferences from TC members.

Please submit your suggestions to ASHRAE Staff member Tony Giometti (Giometti@ashrae.org)

24. Upcoming Workshops and Conferences:

- 1st International Conference on Energy and Indoor Environment for Hot Climates**, February 24-26, 2014, Doha, Qatar. Contact: www.ashrae.org/hotclimates
- 49th AiCARR International Conference of 2014**, February 26-28, 2014, Rome, Italy. Contact: <https://www.ashrae.org/membership--conferences/conferences/ashrae-endorsed-events/2014/49th-edition-of-aicarr-international-conference-of-2014>
- 2014 International Sorption Heat Pump Conference (ISHPC2014)**, Mar. 31 – Apr. 3, 2014, College Park, MD, USA. Contact: <http://www.ceee.umd.edu/events/ISHPC2014/>
- 2014 ASHRAE High Performance Buildings Conference** – April 7-8, 2014, Hyatt Fisherman's Wharf – San Francisco, CA USA. Contact: <http://www.hpbmagazine.org/hpb2014>. Call for Posters currently open through Feb. 21, 2014. Submit online.
- Efficient, High Performance Buildings for Developing Economies** — April 24 - 25, 2014 - Manila, Philippines Contact: www.ashrae.org/Developing2014
- 11th International Energy Agency (IEA) – Heat Pump Conference**, May 12-16, 2014, Montreal, Canada. Contact: www.iea-hpc2014.org - See attached Registration brochure.
- 2014 ASHRAE/IBPSA-USA Building Simulation Conference**–September 10-12, 2014 – Atlanta, GA USA. Contact: www.ashrae.org/Simulation2014. Call for Presenters currently open through Feb. 10, 2014. Submit online.
- ICR2015 - 24th IIR International Congress of Refrigeration** – August 16-22, 2015 – Yokohama, Japan. Contact: <http://www.icr2015.org> . Call for abstracts starts April 1, 2014 and ends Oct. 10, 2014.

- **REMARKS FROM SOCIETY LIAISONS TO TC/TG/TRG CHAIRS**
RESEARCH LIAISON REPORT

None at this time

- **LIAISON REPORTS FROM OTHER COMMITTEES**

None at this time.

- **SUBCOMMITTEE REPORTS**

- **PROGRAM SUBCOMMITTEE– OMAR ABDELAZIZ for ED VINEYARD**

- **1. General Comments and upcoming conferences:**

New York Meeting (this meeting)

- Seminar on Heat exchanger designs for low GWP refrigerants. Chair: Edward A. Vineyard. Presenter: Brain Fricke, Chad Bowers, Man-Hoe Kim. The program was well attended and appeared to be very successful.

Seattle Meeting (June 2014)

- Discussed sponsoring a seminar on performance characteristics on low GWP refrigerants. Yang Zou took the motion and Chad Bowers seconded. It was concluded that the seminar could focus on the discussion of low GWP refrigerants distribution, tube heat transfer and pressure drop characteristics, as a comparison to the conventional refrigerants.
- Discussed sponsoring a seminar on oil retention in heat. Vikrante Aute took the motion and Yi Qu seconded. The seminar would have potential co-sponsorship from TC 3.4. The seminar could focus on oil retention in micro-channel heat exchangers and round tube heat exchangers in various systems.

All voting members present voted for approval **(7-0-0)**.

2. New program ideas:

- A possible conference session for air side modeling for dry and wet condition (for Chicago meeting, Jan 2015)
- A possible conference session for Optimization of heat exchangers (for Chicago meeting, Jan 2015)

RESEARCH SUBCOMMITTEE – CHAD BOWERS

Active Research Projects

- Research Project #1564 - Measurement of Oil Retention in the Microchannel Heat Exchangers
Contractor: Prof. Cremaschi, Oklahoma State University
Project Monitoring Subcommittee: Samuel Yana Motta, Amir Jokar, Yi Qu, Omar Abdelaziz
Prof. Cremaschi provided a presentation with current progress and findings. Due to a lack of projector, the data and graphs were shown on a personal computer. The test matrix was designed as two refrigerants (R134a and R410A) with POE oil in 1 condenser and 2 evaporators. Test matrix was finished for the condenser and ready to move on to the evaporators. Data for oil retention, heat transfer and pressure drop at various OCRs were presented. In general, data showed a trend as expected with a few outliers. The investigation was underway. It was expected to meet the deadline at current progress.
- Research Project #1535 - A Heat Transfer and Friction Factor Correlation for Low Air-side Reynolds Number Applications of Compact Heat Exchangers
Contractor: Prof. Cheng-Xian (Charlie) Lin
Project Monitoring Subcommittee: Chad Bowers, Mark Johnson, Omar Abdelaziz, Xudong Wang
Prof. Lin provided an update. As recommended by PMS, two flow meters were used in the system. After fine tuning, the system showed about 1% capacity difference. Repeatability test showed the system was ready to run. So far, all test samples have been received. But due to the delay in samples, PI may need a 9-month no cost extension. Omar Abdelaziz made the motion to vote, Vikrant Aute seconded; all voting member 7-0-0 Voted for approval

Potential Research Projects

- Discussion of proposals for RFP1645 Development of New Corrosion Test for Al Heat Exchangers (Update on the PMSC)

RAC had approved the proposal, but no further information could be reveal until the final approval. Chad Bowers read the list of PMS

- Update on WS1705- Investigation of Airside Fouling on Outdoor Heat Exchangers
Liping addressed all issues on the work statement. RAC accepted the work statement under the condition that the test matrix is updated.
Liping gave a brief update. The issue was caused by the missing test matrix test number was during the revision of the statement. Current test matrix should include 3 fin densities, 3 types of dust and 2 fouling times, in total of 18 tests.

New Ideas

- Reverse flow in microchannel heat exchangers suggested by Bill Fox – Chad Bowers is still working on RTAR
- Screening of heat transfer and pressure drop characteristics of low GWP refrigerant in small diameter tubes. Omar Abdelaziz and Yi Qu agreed to work on an RTAR. Vikrant Aute offered to help.
- Unconventional materials for heat exchanger construction (i.e. polymer heat exchangers). Shenghan Jin mentioned the possibility of additive manufacture (3D printing) technique of heat exchangers and the interest of TC 1.5 for potential co-sponsorship.
- No further comments was given on active heat transfer enhancement (i.e. Sandia Cooler)
- TC1.3 working on RTAR for NH3 in U-bends. TC8.4 may be interested in co-sponsorship. RAC 1.3 is reviewing the work of RTAR
- It was decided to drop out the charge minimization
- TC 6.3 Dry condition, heat exchanger
- There is emerging need for evaporator that retains the water but minimum the impact on heat transfer.

STANDARDS SUBCOMMITTEE – GARY PRICE (UPDATE BY EMAIL TO LORENZO REPORTED, WHO REPORTED TO THE MAIN TC)

Standard 33 – Method of Testing Forced Circulation Air Cooling and Air Heating Coils.

This standard has been (virtually) completed but not submitted for public review yet. AHRI Standard 410 is in revision and would like to have the benefit of Std 33's Method of Test to use for reference. A meeting has been scheduled for New York by Mark Weber and Ram Narayanamurthy, but it is not listed on the printed schedule of events. From Mark Weber's email, "Meeting space has been scheduled for SPC 33 from 9-10am Tuesday in New York (January 21st) in Madison 3 on the 5th floor."

Bill Fox gave more updates

Standard 25 – Forced and Natural Convection Air Coolers

Due to business conflict, Gordon Struder, was not able to attend the New York meeting. The committee is working on applying the method of test developed in AHRI 420 into Standard 25 with any required modifications. The subcommittee met in Denver and had a productive meeting. Mark Johnson has resigned from the committee. Gordon is planning an Interim Meeting for February to assess where we stand.

Standard 20 - Method of testing for Air Cooled Condensers

The subcommittee met in Denver in June 2013 and had quorum.

Last meeting held was an interim meeting (number 5) on August 11, 2013. The subcommittee was not able to meet in New York and the interim meeting (number 6) will be scheduled tentatively for February

There are a couple of membership changes to report:
Mark Johnson has resigned from the committee.
Zan Liu and Richie Mohan have joined the committee.
The subcommittee will be appointing a new Vice Chair and Secretary.
The work on this standard is moving along.
SPC 20 will hold next meeting on Feb 27th, 2014

HANDBOOK SUBCOMMITTEE – BILL FOX

Bill Fox gave an update. Four chapters (4, 23, 27, 39) still required extensive work before next meeting, need for more help. Aaron Conger, Jun Wang, Chad Bowers, Lorenzo Cremaschi, Kashif Nawaz, Vikrant Aute volunteered to provide help.

MEMBERSHIP – LIPING LIU

Liping Liu gave a brief update. There are 57 active corresponding members. The subcommittee will maintain the list up to date.
Mark Johnson and Kelvin Dunshee will be rolling off the voting membership. Chad Bowers, Liping Liu, Bill Fox, Man-hoe Kim will be rolling on as voting members. In total there will be 8 voting member and 2 non quorum. This will be in effect after Seattle meeting.
Lorenzo Cremaschi declared the responsibility of voting member to make their best efforts to remain active in the committee. It is important to do so for the meeting to meet its quorum and maintain its function. Members should refer to Manual of Procedures for ASHRAE Technical Committees, Task Groups, Multidisciplinary Task groups and Technical Resource Groups for detailed duties and responsibilities.

IX WEB PAGE

The website is in good shape and includes the new logo.
Please be sure to check the website for TC information.
Ebrahim Al-Hajri will no longer be able to be the web master
Yi Qu volunteered to be the new webmaster
It was discussed for the possibility of web conference and committee decided to try on next meeting

X OLD BUSINESS

None.

XI NEW BUSINESS

Lorenzo Cremaschi announced a new subcommittee for honor and award nomination and asked for volunteer.
Shenghan Jin volunteered to work for the subcommittee.

XII ADJOURNMENT

Meeting adjourned at 5:15pm.