



1791 Tullie Circle, N.E./Atlanta, GA 30329  
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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. 8.1 DATE July 10, 2017

TC/TG/MTG/TRG TITLE Positive Displacement Compressors

DATE OF MEETING June 27, 2017 LOCATION Long Beach, CA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Dr. Margaret Mathison	2012	David Bergeron	2013	
Dr. Michael Perevozchikov	2014	Dr. Jason Hugenothe	2014	
Andrew Welch	2012	James Douglas	2016	
Dr. Alex Leyderman	2016	Heinz Juergensen (MNQ)	2013	
Dr. Georgi Kazachki	2014			
Dr. Christopher Seeton	2016			
Mike Wegenka	2014			

**DISTRIBUTION: All Members of TC8.1 plus the following:**

TAC Section Head: Dustin Meredith	SH8.1@ashrae.net
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	See ASHRAE email alias list for needed addresses.
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.

### **Call To Order - Margaret Mathison**

Margaret Mathison called the meeting to order at on Tuesday June 27, 2017 at 3:31pm. A sign-in sheet was circulated and is included as Attachment 1 to these minutes. Reminder to review the ASHRAE Code of Ethics (Attachment 2).

### **Establishment of a Quorum – Margaret Mathison (in lieu of James Douglas Membership Chair)**

A roll call was taken. Voting members present were Dr. Margaret Mathison, Dr. Michael Perevozchikov, Andrew Welch, Dr. Alex Leyderman, Dr. Georgi Kazachki, Dr. Christopher Seeton, and Mike Wegenka. With 7 of 10 voting members present, a quorum was established.

All members and visitors present self-introduced.

### **Approval of the Las Vegas Minutes – Margaret Mathison**

Multiple corrections were amended to the Las Vegas minutes:

- HOF's was corrected to HFOs and reference to already co-sponsored TC 3.4 research was removed as no record could be identified of co-sponsorship in the Research Report
- Added reference to co-sponsorship of Long Beach program "High Efficiency Commercial Refrigeration Systems with Natural Refrigerants"

Chris Seeton moved to accept the Las Vegas minutes as amended and Georgi Kazachki seconded the motion. The motion passed unanimously. (6-0-0, CNV).

### **Chair's Report (from TC/TG Section 8 Breakfast Meeting)**

#### **1. Additional TC E-mail Position Aliases Now Available**

New position e-mail alias addresses have now been created for each of the remaining mandatory positions of the Technical Committee management team (Secretary, Standards Sub. Chair, Program Sub. Chair, Handbook Sub. Chair, and Webmaster). The 16-17 E-mail Alias list with these new position aliases is posted on the ASHRAE website [www.ashrae.org/TCs](http://www.ashrae.org/TCs) under the heading Procedures, Forms & Information for TCs/TGs/MTGs and TRGs. The new 17-18 E-mail Alias list will be posted in the same location shortly after the Long Beach meeting.

#### **2. Name Badges**

As offered in the past, members of TCs who are not registered for the Conference and plan to only attend TC meetings may receive a free, plain white name badge. The purpose of these badges is for TC members not registered for the Conference to be able to identify one another in meetings.

To receive your badge, please go to the ASHRAE Registration desk located in room 104 at the Long Beach Convention Center and look for the sign for "TC Badges." Please identify yourself as someone only attending committee meetings, not registered for the Conference, who would like a white name badge. An ASHRAE staff person will create a badge for you that includes your name, company name and city, state and country (if outside the U.S.). The badge will not have a QR code and will not allow you into the Technical Program. However, if you'd like to register for the entire Conference you can do so in advance or onsite. We realize your time is limited, one-day registrations (\$270 for Members) are available as well as one-session registrations (\$70). If you wish to register for one day of the Technical Program you or one session, you can do so at the ASHRAE Registration desk. The One-Day option gives you access to the Virtual Conference which is viewable on-demand for 18 months. Questions? Contact [meetings@ashrae.org](mailto:meetings@ashrae.org).

#### **3. Seminar and Forum proposals for Chicago are due by Tuesday, August 1st, 2017.**

Please visit the following site to submit your proposal: <https://ashraem.confex.com/ashraem/w18/cfp.cgi>  
For more information, go to: [www.ashrae.org/chicago](http://www.ashrae.org/chicago)

**4. 2017-2018 Hightower Award & Service to ASHRAE Research Award Nominations by Friday, September 1st**  
Nominations for the 2017-2018 George B. Hightower Technical Achievement Award are due to you Section Head by September 1, 2017. The award recognizes outstanding technical leadership and contributions on a TC/TG/TRG during the past four years, excluding research and standards activities. Please go to the Technical Committee page of the ASHRAE website at the following link under the “Procedures, Forms...” heading: <http://www.ashrae.org/tcs>

- Discussion to nominate Rick Hall for the Hightower Award. Alex Leyderman moved to nominate Rick Hall, Andrew Welch seconded; the motion passed unanimously. (6-0-0, CNV). Scott MacBain and Margaret Mathison volunteered to author the nomination

Nominations for the 2017-2018 Service to ASHRAE Research Award for TC volunteer efforts in research are due to RAC research liaison by September 1, 2017. Please go to the Research page of the ASHRAE website at the following link under the “Research Grants and Awards” heading: <http://www.ashrae.org/research>

**5. Request for each TC to briefly review ASHRAE Code of Ethics at start of meeting**

See the following link for the latest version of the ASHRAE Code of Ethics: <https://www.ashrae.org/about-ashrae/>  
The text is attached at the end of the minutes.

**6. CEC Always Seeks TC Volunteers willing to Support Content Development and Quality Control for Society Technical Program at Society Meetings**

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.

**Standards – James Douglas’ Report:**

Subcommittee SPC 23.1R, Margaret Mathison, Chair, *Methods of Testing for Performance Rating Positive Displacement Refrigerant Compressors and Condensing Units That Operate at Subcritical Pressures of the Refrigerant*

- The subcommittee has sent out the PPR1 draft for review. No meeting was scheduled for the Long Beach meeting but due comments on the PPR1 draft (which was passed) an interim meeting has been scheduled for July 17<sup>th</sup> to submit an independent substantive change package for public review to address material that was inadvertently omitted for the original review draft.

Subcommittee SPC23.2-2014, *Methods of Test for Rating the Performance of Positive Displacement Compressors that Operate at Supercritical Pressures of the Refrigerants*

- The committee voted to revise this standard at the winter meeting. Scott MacBain agreed to be chairman. New members and guests are always welcome. Working toward planning first meeting by conference call in August.

Subcommittee 41.9, *Standard Methods for Refrigerant Mass Flow Measurement Using Calorimeters* – M. Perevozchikov

- In May, a SSPC 41 letter ballot to approve the first 41.9 PPR draft failed because a majority of SSPC 41 voting members did not vote. Consequently, the 41.9 Subcommittee will hold monthly interim meetings beginning in August until they reach consensus on a revised first 41.9 PPR draft. Michael Perevozchikov encouraged members to bring review concerns to the meeting so that revisions can be made before the standard is submitted for public review.

Subcommittee 41.10, Standard Methods for Refrigerant Mass Flow Measurement Using Flowmeters – J. Neel

- The 41.10-2013R revision subcommittee met to review the latest working draft on Tuesday, June 27th from 8:00 to 10:00 am in Alford Room on the 2<sup>nd</sup> level of the Renaissance Hotel. Progress was made and action items were assigned. Consensus was achieved on a new definition of “steady state”.

**Other standards that effect the TC 8.01 committee:**

Subcommittee 41.10, Standard Methods for Power Measurement – M. Todd

- The first meeting of the 41.11-2014R revision subcommittee was held on Monday, June 26 from 2:15 to 4:15 PM in Alford Room on the 2<sup>nd</sup> level of the Renaissance Hotel. Progress was made and action items were assigned

Subcommittee 41.11, Standard Methods for Mass Flow Measurement using Flowmeters – Erik Andersen

- The revision work is progressing and new members are always welcome

Guideline 2-2010 (RA 2014)

- Guideline 2 is up for maintenance 2017. This guideline does not meet the mandatory language issue so it will be necessary to revise this standard. The TC1.02 is voted on this subject to revise the guideline. Volunteers were requested to help with the revision process. A chairman will need to be found.

**Program - Erik Anderson**

- TC 8.1 co-sponsored Long Beach Seminar 50: “High Efficiency Commercial Refrigeration Systems with Natural Refrigerants”
- Discussion on scheduling of seminars and interaction within tracks or committee meetings
  - Program for Chicago approved in Las Vegas: Positive Displacement Compressors – Back to Basics
    - To be chaired by Rick Heiden
    - To include 3 presentations (these are concepts, not titles): Positive Displacement State of the Art (Compression Types), Testing of Positive Displacement Compressors, and Updates to Standard 23.1 – Handling Economization in Testing and Analysis
    - Rick needs to confirm with speakers before submission. Seemed to be some confusion over speakers and topics.
  - Program for Chicago approved in Las Vegas: Impact of Regulatory and Market Trends on Compressor and System Design
    - To be chaired by Greg Chilcote
    - Program Type: Seminar, Program Level: Intermediate, Track: Systems and Equipment
    - Overview: Evaluate how the latest trends are impacting HVAC system design, particularly compressor design and application. Review regulatory and market "mega trends", focusing on refrigerants and part load efficiency. Present choices HVAC equipment designers have for circuit sizing and major component selection. Drill deeper into compressor modulation through speed and mechanical unloaders. Conclude with impact of new refrigerants on compressor design.
    - Regulatory and Market Trends – part load efficiency and refrigerant focus. Brian Smith from JCI presenting.
    - Compressor and System Design Integration – focus on choices system design makes to size circuits and select major components. Daikin confirmed they will provide presenter.
    - Compressor modulation – unloading through speed and mechanical means, some discussion about including Variable Vi as well. Matt Cambio from Trane presenting.

- Refrigerants – impact of refrigerants on compressor design. Hung Pham / Michael Perevozchikov from Emerson presenting.
- New program for co-sponsorship in Chicago: “Recent Advances in Solid State Cooling Technologies”. Georgi Kazachki moved to co-sponsor and Chris Seeton seconded. The motion passed. (3-1-2, CNV).
- Speaker ratings – if a speaker is poorly rated, the society may ask that member not present again without proof of speaker training. Also submissions must be made on time to allow review for non-commercialism. Both three strike policies
- No other seminars or conference papers proposed

## Liaisons

### **TAC Section Head – Dustin Meredith**

Thank you members for attendance. Confirmation that quorum was achieved. E-mail [Sh8@ashrae.net](mailto:Sh8@ashrae.net) with any questions for the section head.

### **Section 8 Handbook Chair – David Fisher**

Confirmed that handbook chapters have been submitted for update.

## Research Subcommittee – Craig Bradshaw (Chair)

- If you have ideas or an interest in the research subcommittee, please contact Craig Bradshaw or attend the subcommittee meeting in future meetings.
- 7 RTARS considered, 1 accepted, 3 accepted w/ comments, and 3 rejected
- 11 WS considered, 1 accepted, 7 conditionally accepted, 3 returned
- RAC approved 1 IRG, out of nearly 30 applications
- URP's are now accepted, procedure on the website
- New procedure to the Grant-in-Aid process to incentive attendance at ASHRAE (\$5k held back until student attends)
- New process for PMS Oversight:
  - Payments will be made via milestones
  - New WS's will need milestones via a new format
  - Appropriate and timely actions will be taken for the delayed or non-completed milestone'

Looking for suggestions for how to help disseminate ASHRAE research to the masses

- There was discussion of what research is currently being pursued and what may be needed in the areas of refrigerants and oils
  - RTAR 1793 was accepted for motor cooling research of thermal conductivity of hermetic motor components.
    - Rick Heiden to have a new Work Statement ready for Chicago
  - TC 3.4 pursuing multiple related topics researching new refrigerants and oils
    - Foaming properties of low-GWP refrigerant mixtures at Work Statement (already cosponsored)
    - Properties of HFOs and lubricants at Work Statement
    - A model of low-GWP refrigerant and oil mixtures at RTAR
  - Michael Perevozchikov made a motion to co-sponsor TC 3.4 research proposal “FOAMABILITY PROPERTIES OF LGWP REFRIGERANT AND OIL MIXTURES” and it

was seconded by Mike Wegenka. The motion passed unanimously. (6-0-0, CNV).

- New ideas related to compressor performance modeling were also discussed:
  - Drew Welch opened discussion on a research project to understand the relationship between sealing contact interface, relative surface motion, and flow motion to understand how positive displacement compression mechanisms impact volumetric efficiency and recirculation. There was interest, but insufficient detail to make a motion.
  - Craig Bradshaw opened discussion on a research project to develop software that would translate compression mechanism solid models into 1-dimensional numerical models. There was interest, but insufficient detail to make a motion.
  - Connor Hayes opened discussion on researching methods of measuring viscosity of 41-series lubricants, particularly with refrigerant mixtures. Discussion focused on the impact of preferential solubility and the appropriateness of existing methods of test.

#### **Handbook – Alex Leyderman (Chair)**

- All of the handbook chapters are current
- Alex would like to begin to collect modern diagrams (unrelated to obsolete refrigerants) for future chapter revisions
  - Table 1. Typical Design Features of Reciprocating Compressors. Halo- and Fluoro- references should be removed. Typical design features should be revised for new/alternative refrigerants.
  - Figure 10. Capacity and Power Input Curves should be updated for contemporary refrigerant(s)
  - Figure 14. Performance Curves for Typical Rolling-Piston Compressor should be updated. R22 is obsolete.
  - Figure 28. Typical Open-Compressor performance should be updated. R22 is obsolete.

#### **Membership – Jim Douglas (Chair)**

- We have 10 voting members at the time of this meeting, 1 non-quorum international member
- We have Andrew Welch, David Bergeron, and Heinz Juergensen (MNQ) rolling off June 30; Scott MacBain, John Neel, Craig Bradshaw, Doug Collings, and Eric Anderson rolling on 7/1/16

#### **Website – Greg Chilcote (Webmaster)**

- The website is up to date for minutes and agenda
- Will request permission to add sponsored presentations from Las Vegas and Long Beach

#### **Old Business – Margaret Mathison**

- None.

#### **New Business - Margaret Mathison**

- Justin Prosser updated the committee on the progress and meeting plan for an AHRI Centrifugal Compressor Rating Standard.
- Orkan Kurtulus asked the members to consider attending the 2018 Purdue Conferences (July 9-12, 2018)

#### **Motion to Adjourn**

- Motion to adjourn by Drew Welch, Second by Mike Wegenka

**Attachment 1 ATTENDANCE LIST**

TC 8.1 Attendance List – Las Vegas

Name	Company	Status
Margaret Mathison	Iowa State University	Chair/VM
Michael Perevozchikov	Emerson	Vice Chair/VM
Drew Welch	Johnson Controls	Secretary/VM
Craig Bradshaw	Oklahoma State University	Research/CM
Greg Chilcote	Trane	Webmaster/CM
Alex Leyderman	Fairchild Controls	Handbook/VM
Erik Anderson	Anderson Engineering	Programs/CM
Georgi Kazachki	Dayton Phoenix Group	VM
Chris Seeton	Shrieve	VM
Mike Wegenka	Trane	VM
John Neel	Johnson Controls	CM
Scott MacBain	Carrier	CM
Doug Collings	Tecumseh Products	CM
Eckhard Groll	Purdue University	CM
Alexander Lifson	Carrier	CM
Dwayne Johnson	Trane	CM
Joshua Hughes	Chemours	PCM
David Halbrooks	Purdue University	PCM
Orkan Kurtulus	Purdue University	PCM
Stefan Elbel	CTS / UIUC	PCM
Justin Prosser	AHRI	Guest
Conner Hayes	Trane	Guest
Gil Staffend	AeraDIGM	Guest
Laurent Abbas	Arkema	Guest
Jun Liu	Shrieve	Guest
Miguel Boscan	Bitzer US	Guest
Andrew Punsulla	Chemours	Guest
Bryan Armstrong	Carel	Guest
Takashi Shibamura	Daikin	Guest
Scott Fisher	State Farm Retired	Refrigeration Handbook Liaison
Dustin Meredith		Section 8 Head

## Attachment 2: Code Of Ethics

### ASHRAE Code of Ethics

(Approved by ASHRAE Board of Directors January 31, 2007)

As members of ASHRAE, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct.

Efforts of the Society, its members, and its bodies shall be directed at all times to enhancing the public health, safety and welfare.

Members and organized bodies of the Society shall be good stewards of the world's resources including energy, natural, human and financial resources

Our products and services shall be offered only in areas where our competence and expertise can satisfy the public need.

We shall act with care and competence in all activities, using and developing up to date knowledge and skills.

We shall avoid real or perceived conflicts of interest whenever possible, and disclose them to affected parties when they do exist.

The confidentiality of business affairs, proprietary information, intellectual property, procedures, and restricted Society discussions and materials shall be respected.

Each member is expected and encouraged to be committed to the code of ethics of his or her own professional or trade association in their nation and area of work.

Activities crossing national and cultural boundaries shall respect the ethical codes of the seat of the principal activity.