



1791 Tullie Circle, N.E./Atlanta, GA 30329

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TC/TG/MTG/TRG MINUTES COVER SHEET

APPROVED

(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 February 17, 2020

TC/TG/MTG/TRG TITLE Positive Displacement Compressors

DATE OF MEETING February 4, 2020 LOCATION Orlando, FL

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Dr. Michael Perevozchikov	2018	Doug Collings	2018	See Attachment 1
John Neel	2017			
James Douglas	2016			
Dr. Christopher Seeton	2016			
Erik Anderson	2017			
Dr. Craig Bradshaw	2018			
Scott MacBain	2017			
Rick Heiden	2018			
Eric Berg	2018			
Dr. Alex Leyderman	2016			
Joe Sanchez	2018			

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

Call to Order - Michael Perevozchikov

Michael Perevozchikov called the meeting to order at 3:30 PM on Tuesday, February 4, 2020. Attendees were reminded to review the ASHRAE Code of Ethics (<https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>).

All members and visitors present self-introduced. There were 30 total attendees at the meeting.

Establishment of a Quorum – Michael Perevozchikov

A roll call was taken, and a quorum was established with 10 of 12 Voting Members present. Rick Heiden joined the meeting during the discussion of research, bringing the count to 11 of 12 Voting Members present. A sign-in sheet was circulated and is included as Attachment 1.

Approval of Minutes – Michael Perevozchikov

Craig Bradshaw moved to accept the Kansas City minutes as distributed and Scott MacBain seconded the motion. The motion passed. (9-0-0-2, CNV).

Chair's Report – Michael Perevozchikov

- Michael announced that paper copies of the agenda and meeting minutes **will not** be provided at future meetings. Instead, electronic copies will be distributed by e-mail and posted to the TC 8.1 website prior to the meeting.
- From TC/TG Section 8 Breakfast Meeting:
 - The main topic of discussion was the reorganization of TCs, which aims to increase collaboration, meeting efficiency, and effectiveness of members' volunteer time.
 - The TC MOP calls for each TC to evaluate their committee on an annual basis to determine whether it should continue, merge, or dissolve.
 - TC 8.1 has decided to continue as an independent committee rather than merging with TC 8.2.
 - TCs 8.1 and 8.2 will hold a joint meeting of the program, research, and handbook subcommittees at future meetings
 - TC 8.2 successfully held a virtual subcommittee meeting prior to the Orlando meeting
 - Several TC 8.1 members expressed a preference for continuing to hold subcommittee meetings at the conference rather than virtually
 - A new Refrigeration Committee for Comfort, Process and Cold-Chain has been created.

ASHRAE Standards –James Douglas

- **Standard 23.1, *Methods of Test for Performance Testing Positive Displacement Compressors that Operate at Subcritical Pressures of the Refrigerants*.** Standard 23.1-2019 has been published. Congratulations to Margaret Mathison, the chair of SPC 23.1-2010R, and her committee.
- **Standard 23.2, *Methods of Test for Rating the Performance of Positive Displacement Compressors that Operate at Supercritical Pressures of the Refrigerants*.** Standard 23.2-2019 has been published. Congratulations to Scott McBain, the chair of SPC 23.1-2010R, and his committee.
- **Standard 23P, *Methods for Performance Testing Positive Displacement Refrigerant Compressors and Compressor Units*.** SPC 23P (formerly SPC 226P), chaired by Scott McBain, had three interim meetings in November and December that culminated in a vote to send out the standard for public review.

- **Standard 41.4-2014R, *Methods for Proportion of Lubricant in Liquid Refrigerant Measurement*.** SSPC 41 Subcommittee 41.4-2014R, chaired by Jim Douglas, met to review the latest working draft on Monday. The committee is struggling with hardware for one part of the standard but may have a solution. An interim meeting will be held in April, and the goal remains to reach consensus on the first PPR draft at the 2021 summer conference.
- **Standard 41.9-2018, *Standard Methods for Refrigerant Mass Flow Measurement Using Calorimeters*.** Michael Perevozchikov is the chair of the committee. This standard was published in 2018 but will be revised early to fix equations in the section on oil circulation.
- **Standard 41.10-2013R, *Standard Methods for Refrigerant Mass Flow Measurement Using Flowmeters*.** John Neel is the chair of the committee. At Orlando, the ASHRAE Standards Committee approved the first 41.10 Publication Public Review draft for public review. Congratulations to John Neel, the 41.10 Subcommittee Chair, and his committee.
- **Standing Standards Project Committee (SSPC) 41, *Standard Methods for Measurement*.** The committee, chaired by Mike Shows, will be meeting on Tuesdays, from 9:30 AM to 12:00 PM, starting at the June 2020 ASHRAE Conference.

AHRI Standards Activity – Justin Prosser

- **Standard AHRI 540-2019, *Performance Rating of Positive Displacement Refrigerant Compressors*.** The standard is complete but not yet published, as it needs review by the refrigeration standard subcommittee. This standard combines the content of five (5) separate compressor standards (AHRI 510, 540, 545, 570, and 571) allowing a single rating standard for positive displacement compressors.
- A YouTube Video was developed on the topic of Compressor Performance Uncertainties and can be accessed at <https://www.youtube.com/watch?v=S96lQetZzkQ>. The purpose is to communicate the content of a 2017 AHRI/ASERCOM white paper entitled “Tolerances and Uncertainties in Performance Data of Refrigerant Compressors.”

Program - Erik Anderson

- TC 8.1 sponsored two seminars in Orlando:
 - Seminar 44 (Advanced), “Advancement in Transcritical CO₂: Refrigeration and Compression” on Tuesday February 4. Joe Sanchez chaired the seminar and said approximately 70 people attended. Thanks to Riley Barta, Alessandro Silva, and Emir Alemeic for presenting and to Joe for chairing the session.
 - Seminar 50 (Intermediate), “Why Did I Take Thermodynamics? Practical Applications to HVAC&R Equipment” on Tuesday, February 4. Alex Schmig chaired the seminar and said approximately 30 people attended. Thanks to Craig Bradshaw, Omer Sarfraz, and Davide Ziviani for presenting and to Alex for chairing the session.
- TC 8.1 co-sponsored three seminars in Orlando:
 - Seminar 54 (Advanced), “Lubricants and Lubrication: What Is Important for Lower GWP Refrigerants?” on Tuesday, February 4. Joseph Karnaz chaired the seminar.
 - AHR Expo Session 1 (Advanced), “State-of-the-Art Refrigeration Technologies with Lower Environmental Impact, Part 1” on Monday, February 3. Georgi Kazachki chaired the session and reported that there was significant interest in the session.

- AHR Expo Session 6 (Advanced), “State-of-the-Art Refrigeration Technologies with Lower Environmental Impact, Part 2” on Monday, February 3. Georgi Kazachki chaired the session.
- Potential program topics were discussed during the program subcommittee meeting on Sunday:
 - A seminar was proposed for Austin (Summer 2020) titled “The Future of Compression: Novel Compressor Technologies,” to be chaired by Craig Bradshaw. The seminar will focus on far-reaching compressor technologies. Speakers will include Craig Bradshaw’s student (peristaltic compressors), Yunho Hwang (electrochemical compressors) and Davide Ziviani (advancements on chemical looping heat pump technology).
 - Jim Douglas moved to sponsor the seminar and Scott MacBain seconded the motion.
 - The motion passed (10-0-0-1, CNV).

Research Subcommittee – David Ziviani

- Update from Research Chair Breakfast:
 - Currently there are 49 active research projects.
 - The funding limits per contractor were raised from \$100k to \$150k (up to \$250k with TAC approval; higher amounts with BOD approval)
 - New Investigator Award (\$125k over 3 years) – 11 applications were submitted; the winner for 2020 has been selected but not yet communicated
 - Homer Adams Award – 2 nominations were submitted and one selected
 - Service to ASHRAE Award – no nominees this year (nominations due in fall)
 - Innovative Research Grant – awarded to Travis Horton from Purdue this year; 19 preproposals were reviewed for the 2020 – 2021 grant, of which 4 will be selected for full proposal
 - A new committee was formed in November to define the research strategy for 2019 – 2024, chaired by Reinhard Radermacher
 - A survey should have gone out to all members on Jan 13th to encourage inputs to strategic planning (sent to over 40,000, but only 700 responses received); search spam folder if you did not receive the survey
- Update on WS 1793:
 - Title: “Development of method of test for motor component thermal conductivity”
 - Sponsorship: 8.2 (sponsor), 8.1 (co-sponsor), 1.11 (co-sponsor)
 - Lead Author: Rick Heiden
 - Rick met on Monday with Chris Seeton; need to make some small revisions for RAC and then will resubmit this spring
- Update on WS1830
 - Title: “Foamability properties of LGWP Refrigerant and Oil Mixtures”
 - Sponsorship: 3.4 (sponsor), 8.1 (co-sponsor)
 - Lead Author: Chris Seeton
 - Project is out for bid; will form PMS after this meeting
- Potential research topics were discussed during the research subcommittee meeting on Sunday:
 - Davide Ziviani brought up the idea of a modeling effort to characterize heat pump technology across climate zones in the US and make design recommendations based on utility rates
 - Would be joint effort of 8.1 and 8.11; lots of interest when brought up at 8.11

- Need an individual to help write RTAR; Steve Rudy volunteered to talk to Craig Bradshaw and Davide Ziviani about the concept and possibly write the RTAR
- Alex Leyderman brought up the possibility for research on how compression waves propagate in refrigerant/lubricant mixtures; becoming an issue with higher speed compressors
- Craig Bradshaw mentioned that issues with measurement encountered by the subcommittee revising Standard 41.4 may be an opportunity for a research project
 - Jim Douglas confirmed that a project would be useful even if it doesn't get incorporated into the current revision of the standard

Handbook – Scott MacBain

- 2020 HVAC Systems and Equipment Handbook
 - Two chapters were submitted:
 - Chapter 38, "Compressors" (Sections 1, 2 and 3)
 - Chapter 43, "Liquid-Chilling Systems" (Sections 1, 2 and 4)
 - So far, no feedback has been received from the editors
- 2022 Refrigeration Handbook
 - One chapter will require revision:
 - Chapter 8, "Dehydration and Charging"
 - Scott will set up interim meetings in order to finish revision work by this time next year
 - E-mail Scott to be included on the web meeting invite
 - Manufacturers are especially needed

Membership – Jim Douglas

- The committee currently has 12 voting members
- Jim Douglas, Rick Hall, Alex Leyderman, and Michael Perevozchikov will roll off at the end of June
- Georgi Kazachki, Margaret Mathison, and Justin Prosser will roll on at the start of July
- Craig Bradshaw will become chair and Joe Sanchez will become vice-chair

Liaison Reports

- Kevin Mercer is taking over as Section 8 Head
 - Due to issues with roster updates, download the roster spreadsheet and edit it to reflect changes
 - Two new MTGs have been formed:
 - Controlled environment agriculture
 - Refrigeration and air conditioning plant assessment guide
 - Reminded members to review the ASHRAE Code of Ethics

Website – Eric Berg (Webmaster)

- Website is up to date
- Eric will replace draft minutes with final minutes
- Minutes also will be posted on Basecamp (basecamp.com)

Old Business – Michael Perevozchikov

None.

New Business - Michael Perevozchikov

None.

Motion to Adjourn

Motion to adjourn by Jim Douglas at 4:40 PM.

Attachment 1 **MEETING ATTENDANCE LIST AND CURRENT ROSTER**

Sign in

Roster

TC8_1 -Sign-in-Sheet
Winter Orlando 2020C

AshraeCommitteeRosterwithYEA_2222020.f

Note: Double Click to open pdfs

TC 8.1 Attendance List – Orlando

Name	Company		Status	YEA
Dr Michael Perevozchikov, PI	Emerson	Michael.Perevozchikov@emerson.com	Chair/VM	
Dr Craig R Bradshaw	Oklahoma State University	craig.bradshaw@okstate.edu	Vice Chair /VM	
Mr Rick M Heiden	Trane - Ingersoll Rand	rheiden@trane.com	VM	
Dr Alexander Leyderman, PhD	Triumph Group	adleyderman@triumphgroup.com	VM	
Mr Erik S. Anderson	Anderson Engineering	eanderson@aenpi.com	Program/VM	
Mr James L Douglas	Imagineering and MORE LLC	jim.douglas.imagineering@gmail.com	Std/Memb./VM	
Mr Eric Berg	Lennox Industries	eric.berg@lennoxind.com	VM	
Mr Scott M MacBain, Sr	Carrier Corporation	scott.macbain@carrier.utc.com	Handbook/VM	
Mr John L Neel, PE	Johnson Controls Inc.	john.l.neel@jci.com	VM	
Mr Joseph Sanchez	Bitzer US, INC	JSANCHEZ@BITZERUS.COM	VM	
Dr Christopher J Seeton	Shrieve Chemical Products	cseeton@shrieve.com	Research Liaison/VM	
Dr Davide Ziviani PhD	Purdue University - Ray W	dziviani@purdue.edu	Research/CM	YEA
Mr Riley B Barta	Purdue University	bartar@purdue.edu	PCM	YEA
Jun Pyo Lee	Carrier	junpyo.lee@carrier.utc.com	PCM	
Mr Steve Rudy	Fandrich Cone Harvesters	steve@coneharvesters.com	PCM	
Mr Matthew Cambio	Ingersoll Rand	mcambio@trane.com	CM	
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Mr Heinz Juergensen	Bitzer	heinz.juergensen@bitzer.de	CM	
Dr Georgi S Kazachki	Dayton Phoenix Group	kazachki@comcast.net	CM	
Mr.Orkan Kurtulus	Purdue University	orkankurtuis@yahoo.com	CM	YEA
Dr Margaret M Mathison, PhD		3mathison@gmail.com	CM	
Mr Justin Mark Prosser	AHRI	jprosser@ahrinet.org	CM	
Jessica Jude	CPI	Jessica.Jude@lubrizol.com	PCM	YEA
Alex Schmig	Trane	Alex.Schmig@trane.com	PCM	YEA
John S. Vondenstein	Danfoss	john.vondenstein@danfoss.com	PCM	
Kushan Abeyawardane	Texas A&M University	kushan2018@tamu.edu	guest	YEA
Kris Crosby	Arkema	kris.crosby@arkema.com	guest	
Robert Chevasco	Shrieve	rchevasco@shrieve.com	guest	
Haotian Liu	Purdue University	liu1460@purdue.edu	guest	

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.