



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

404-636-8400

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 14, 2020

TC/TG/MTG/TRG TITLE Positive Displacement Compressors

DATE OF MEETING July 14, 2020 LOCATION Virtual (in place of Austin, TX)

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Dr. Michael Perevozchikov	2018	John Neel	2017	See Attachment 1
Doug Collings	2018	Rick Heiden	2018	
James Douglas	2016	Dr. Alex Leyderman	2016	
Dr. Christopher Seeton	2016			
Erik Anderson	2017			
Dr. Craig Bradshaw	2018			
Scott MacBain	2017			
Eric Berg	2018			
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 3:00 PM on Tuesday, July 14, 2020. Attendees were reminded to review the ASHRAE Code of Ethics (<https://www.ashrae.org/about/governance/code-of-ethics>).

All members and visitors present self-introduced. There were 26 total attendees at the meeting.

Establishment of a Quorum – Michael Perevozchikov

A roll call was taken and a quorum was established with 9 of 12 Voting Members present. A sign-in sheet was circulated and is included as Attachment 1.

Review of Scope of 8.1 – Michael Perevozchikov

The scope of the committee was reviewed to affirm that it would like to continue as a technical committee. The possibility of merging with TC 8.2 was discussed, but the committee agreed that 8.1 and 8.2 have sufficient activities to remain independent committees with shared subcommittee meetings. Chris Seeton moved to continue as TC 8.1 with the scope as defined and Jim Douglas seconded the motion. The motion passed. **(8-0-0-3, CNV)**.

Approval of Minutes – Michael Perevozchikov

Craig Bradshaw moved to accept the Orlando minutes as distributed and Scott MacBain seconded the motion. The motion passed. **(8-0-0-3, CNV)**.

Liaison Report – Chris Seeton

ASHRAE is low on funds but is still approving RTARs. Research is being delayed, as well as student grants, innovative research grants, etc. If Chicago is cancelled, there will be a significant shortfall in the budget (\$700k - \$1M below the normal \$2M budget). However, TCs should continue to propose research to be prepared for when funding does improve.

Chair's Report – Craig Bradshaw (for Michael Perevozchikov)

- Craig attended the breakfast on May 28th in place of Michael.
- The TC reorganization committee met for the last time in January and are preparing a final report before disbanding. Any further reorganization efforts will be led from within TAC.
- There is a new procedure for interim meetings requiring interim meeting details to be posted on the website at least two weeks in advance.
- They are updating the 2019-2024 strategic plan to be unveiled sometime soon.
- CEC announced the 8 tracks for Chicago – many with COVID-19 inspiration.
- The Refrigeration committee has added 7 new subcommittees and are in need of members. Reach out to Mike Vaughn if interested in volunteering.
- The Environmental Health committee gave an update on ASHRAE's efforts related to COVID guidance.
- The Research Advisory Panel was tasked with generating a strategic plan for ASHRAE research; they defined 7 initiatives to be included and are drafting a final report.
- RAC update focused on budget concerns. Not considering URPs, IRGs, or student grants starting August 1. They encouraged members to donate to local chapters' research funds, which can be done through the "donate now" button on the ASHRAE homepage.

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 through review and the galley proofs have been approved. 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*.** The first 23P Publication Public Review (PPR) draft passed public review without any comments. ASHRAE Staff are now preparing Standard 23-2020 for publication. Congratulations to Scott MacBain, the chair of SPC-23P and his project committee. Standard 23-2020 combines Standards 23.1-2019 and 23.2-2019 into a single standard.
- **Standard 41.4-2014R, *Methods for Proportion of Lubricant in Liquid Refrigerant Measurement*.** SSPC 41 Subcommittee 41.4-2015R, chaired by Jim Douglas, will not meet during the Austin Virtual Conference. However, a 41.4-2015R interim meeting will be held before the 2021 ASHRAE Winter Conference in Chicago if there are test results for the latest lubricant sampling apparatus for review.
- **Standard 41.9-2018, *Standard Methods for Refrigerant Mass Flow Measurement Using Calorimeters*.** Michael Perevozchikov, the 41.9-2018R revision subcommittee chair and his subcommittee reached consensus on a first 41.9-2018R Publication Public Review (PPR) draft during an interim meeting that was held on May 13, 2020. The SSPC 41 voting members will begin to vote to recommend the ASHRAE Standards Committee approves the first 41.9 2018R PPR draft for public review during the virtual SSPC 41 meeting on Wednesday, July 15, 2020, from 10:00 AM to 12:00 PM, and that vote will be followed by a continuing letter ballot vote for the voting members who do not attend the July 15th meeting.
- **Standard 41.10-2013R, *Standard Methods for Refrigerant Mass Flow Measurement Using Flowmeters*.** The first 41.10-2014R Publication Public Review (PPR) draft passed public review without any comments. ASHRAE Staff are now preparing Standard 41.10-2020 for publication. Congratulations to John Neel, the chair of 41.10-2014R revision subcommittee and his subcommittee.
- Jim will follow up with ASHRAE to determine whether any paperwork is required to withdraw 23.1 and 23.2 upon publication of Standard 23.

AHRI Standards Activity – Justin Prosser

- **Standard AHRI 540-2019, *Performance Rating of Positive Displacement Refrigerant Compressors*.** The standard has been published. 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.

Program - Erik Anderson

- TC 8.1 sponsored one virtual seminar:
 - Seminar 44 (Intermediate), “The Future of Compression: Novel Compressor Technology” on Tuesday February 4. Craig Bradshaw chaired the seminar and said approximately 10 people attended the Q&A session with good discussion. Thanks to Davide Ziviani, Mazharul Islam, and Yunho Hwang for presenting and to Craig for chairing the session.

- Potential program topics were discussed during the program subcommittee meeting with TC 8.2:
 - A seminar was proposed for Chicago (Winter 2020) titled “What Makes a Compressor a Heat Pump Compressor?” to be chaired by Davide Ziviani. The seminar will focus on heat pump compressor technologies. Speakers will include Craig Bradshaw, Drew Turner and Mark Rogan. TC 8.2 and 8.11 voted to co-sponsor.
 - Michael Perevozchikov moved to sponsor the seminar and Erik Anderson seconded the motion.
 - The motion passed **(8-0-0-3, CNV)**.
 - TC 8.2 is sponsoring a seminar for Chicago (Winter 2020) titled “CFD for Compressors” to be chaired by Matt Cambio. Speakers will include a speaker from Trane on centrifugals, Davide Ziviani on meshing in rolling piston or single screw, and Emerson on CFD in scrolls. Anyone who could speak on twin screw or reciprocating should contact Matt Cambio.
 - Craig Bradshaw moved to co-sponsor the seminar and Joe Sanchez seconded the motion.
 - The motion passed **(8-0-0-3, CNV)**.
 - TC 10.7 is sponsoring a seminar titled “Latest Developments in Low GWP Refrigerants and Systems for Refrigeration” to be chaired by Georgi Kazachki. It will be co-sponsored by 3.1 and 10.6, and Refrigeration committee. Speakers will include Riley Barta.
 - Craig Bradshaw moved to co-sponsor the seminar and Michael Perevozchikov seconded the motion.
 - The motion passed **(8-0-0-3, CNV)**.
 - A potential presentation summarizing the revisions to ASHRAE 23 and AHRI 225 was discussed and Justin Prosser offered to chair. However, it was decided to hold the seminar until the next annual meeting in order to allow time for 225 to be published.
 - A potential presentation on back-to-basics for positive displacement and centrifugal compressor technologies was discussed and Davide Ziviani offered to chair. However, it was decided to hold the seminar until the next annual meeting. This will be discussed with TC 8.2 in Chicago.
 - Craig Bradshaw proposed a seminar for Chicago (Winter 2020) titled “Numerical Challenges in Modeling of Vapor Compression Systems and Components” to be chaired by Margaret Mathison. Speakers will include Craig Bradshaw and one of his Ph.D. students speaking on overcoming numerical challenges associated with the z-compressor, and a speaker from Purdue speaking on dynamic modeling at the system level.
 - Erik Anderson moved to sponsor the seminar and Michael Perevozchikov seconded the motion.
 - The motion passed **(8-0-0-3, CNV)**.

Research Subcommittee – David Ziviani (Chair)

- Update from Research Chair Breakfast:
 - Typically research budgets are \$2.6 – 2.7M per year, but reductions will occur due to COVID.
 - Let Davide know of any recommendations for the Hightower Award.
- 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
 - The WS was conditionally approved with some notes
- Update on WS 1879
 - Title: “Foamability properties of LGWP Refrigerant and Oil Mixtures”
 - Sponsorship: 3.4 (sponsor), 8.1 (co-sponsor)

- Lead Author: Chris Seeton
- PES has evaluated the bids and will communicate results through RAC.
- Craig Bradshaw and Davide Ziviani submitted an URP on the future of compressors technologies for air-conditioning applications with near zero-GWP refrigerants. The proposal will be passed to TC 8.1 as the TC with the technical expertise to evaluate the URP so the voting membership can review. Joe Sanchez will have to oversee the vote as vice chair since Craig cannot be involved.

Handbook – Scott MacBain

- A joint subcommittee meeting was held with TC 8.2
- 2020 HVAC Systems and Equipment Handbook
 - Two chapters were published:
 - Chapter 38, "Compressors" (Sections 1, 2 and 3)
 - Chapter 43, "Liquid-Chilling Systems" (Sections 1, 2 and 4)
- 2022 Refrigeration Handbook
 - One chapter will require revision:
 - Chapter 8, "Dehydration and Charging"
 - Volunteers are needed to help with the revision (due in April 2021)
- Chapter 8 Volunteers:
 - Joe Sanchez
- Chapter 38 Volunteers:
 - Davide Ziviani, Michael Perevozchikov, Craig Bradshaw, Rick Heiden, Scott MacBain
- Chapter 43 Volunteers:
 - Rick Heiden, Scott MacBain
- Scott will set up interim meetings in order to finish revision work
 - 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 Heiden, Alex Leyderman, and Michael Perevozchikov will roll off at the end of July
- Davide Ziviani, Georgi Kazachki, Margaret Mathison, and Justin Prosser will roll on at the start of August
- Craig Bradshaw will become chair, Joe Sanchez will become vice-chair, and Margaret will serve as secretary. Scott MacBain will replace Alex Leyderman as handbook chair.

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 4:37 PM.

Attachment 1 – Meeting Attendance List

	Name	Company		Status
1	Dr Michael Perevozchikov, PhD	Emerson	Michael.Perevozchikov@Emerson.com	Chair / VM
2	Dr Craig R Bradshaw	Oklahoma State University	craig.bradshaw@okstate.edu	Vice Chair/VM
3	Mr Erik S. Anderson	Anderson Engineering	eanderson@aenpi.com	Program/VM
4	Mr James L Douglas	Imagineering and MORE LLC	jim.douglas.imagineering@gmail.com	Std/Memb./VM
5	Mr Doug Collings, PE	Trane	doug.collings@trane.com	Webmaster/VM
6	Mr Eric Berg	Lennox Industries	eric.berg@lennoxind.com	VM
7	Mr Scott M MacBain, Sr	Carrier Corporation	scott.macbain@carrier.utc.com	Handbook/VM
8	Mr Joseph Sanchez	Bitzer US, INC	JSANCHEZ@BITZERUS.COM	VM
9	Dr Christopher J Seeton	Shrieve Chemical Products	cseeton@shrieve.com	VM
10	Dr Davide Ziviani PhD	Purdue University - Ray V	dziviani@purdue.edu	Research/CM
11	Mr Riley B Barta	Purdue University	bartar@purdue.edu	CM
12	Mr Steve Rudy	Fandrich Cone Harvesters	steve@coneharvesters.com	CM
13	Mr Jerry David Edwards	Bristol Compressors Inc.	jerry.edwards@lge.com	CM
14	Mr Stefan Elbel	University of Illinois	stefanelbel@gmail.com	CM
15	Dr Eckhard A. Groll	Purdue University	groll@purdue.edu	CM
16	Mr Heinz Juergensen	Bitzer	heinz.juergensen@bitzer.de	CM
17	Dr Georgi S Kazachki	Cryotherm	kazachki@comcast.net	CM
18	Dr Satheesh Kulankara	Johnson Controls	satheesh.kulankara@jci.com	CM
19	Dr Margaret M Mathison, PhD	Iowa State University	3mathison@gmail.com	CM
20	Mr Justin Mark Prosser	Danfoss	justin.prosser@danfoss.com	CM
21	Mr Hermann Renz	Bitzer Kuehlmaschinenbau	hermann.renz@bitzer.de	CM
22	Mr Andrew M Welch	Emerson	drew.welch@emerson.com	CM
23	Kris Crosby	Arkema		Guest
24	Mark Rogan	Arctic Chiller Group	markr@arcticchillergroup.com	Guest
25	Neal Lawrence	Creative Thermal Solutions	neal.lawrence@creativethermalsolutions.com	PCM
26	Wayne Zhang	Thermofisher	wayne.zhang@thermofisher.com	PCM

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.