



1791 Tullie Circle, N.E./Atlanta, GA 30329  
**404-636-8400**  
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 25. June 2019

TC/TG/MTG/TRG TITLE Positive Displacement Compressors

DATE OF MEETING January 15, 2019 LOCATION Atlanta, GA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Dr. Michael Perevozchikov	2018	Dr. Alex Leyderman	2016	See Attachment 1
John Neel	2017	James Douglas	2016	
Joe Sanchez	2018			
Dr. Christopher Seeton	2016			
Erik Anderson	2017			
Dr. Craig Bradshaw	2018			
Doug Collings	2018			
Scott MacBain	2017			
Rick Heiden	2018			
Eric Berg	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 on Tuesday, January 15, 2019 at 3:30pm. Reminder 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 33 total attendees at the meeting.

### **Establishment of a Quorum – Michael Perevozchikov**

The current roster shows 12 voting members and was circulated during the meeting along with a sign-in sheet. Both are included as Attachment 1. A roll call was taken and there were 10 Voting Members present, and Michael Perevozchikov declared quorum was established.

### **Approval of Minutes – Michael Perevozchikov**

Scott MacBain **Motion**, Craig Bradshaw 2nd to accept the Houston minutes as distributed. The motion passed. (10-0-1-1, CV). Note: abstention due to not having attended Houston meeting.

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

The concept of creating functional groups in was presented by Michael Perevozchikov and Dustin Merideth. The ASHRAE communication on this topic is attached. TC discussion in the topic is summarized on the New Business section.



2019 TWG  
Reorganization Han

### **Liaison Reports**

Section 8 Head Dustin Meredith

Thank you members for attendance. Confirmation that quorum was achieved.

Discussed initiative to realign TC's into larger functional groups.

**ACTION ITEM:** TC 8.1 to submit response form on said topic to Dustin within 60 days.

### **Standards – Scott MacBain for James Douglas**

SPC 23.1-2010R, “Methods of Testing For Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Temperatures of the Refrigerant.”

All public reviews are complete and there are not unresolved comments. 23.1-2019 will be processed through ASHRAE staff towards publication. Congratulations to Chair Margaret Mathison and her committee.

SPC 23.2P, “Methods of Test for Performance Rating Positive Displacement Refrigerant Compressors That Operate at Supercritical Temperatures of the Refrigerant.” Completed edits to drafts, committee voted to move towards public review. Scott MacBain is the chair of this committee.

SPC 226P, “Methods for Performance Testing Positive Displacement Refrigerant Compressor and Compressor

Units”. Essentially combining 23.1 and 23.2. Renumbering this standard to 226P instead of 23 will induce significant non-value added work on industry which is an issue.

**Motion:** by Scott McBain, 2<sup>nd</sup> by John Neel to rename 226P to 23P.

**Vote: 10-0-0-2**

Subcommittee 41.9, “Standard Methods for Refrigerant Mass Flow Measurement Using Calorimeters”. Standard published, and committee was dismissed. Congratulations to Chair Michael Perevozchikov and his committee.

Subcommittee 41.10, “Standard Methods for Refrigerant Mass Flow Measurement Using Flowmeters” – John Neel. The 41.10-2013 waiting results of ad-hoc committee on steady state flow, making updates on reporting section. Anticipate being on time.

Subcommittee 41.4, “Standard Methods for Measurement of Proportion for Lubricant in Liquid Refrigerant” - No update

### **Program - Erik Anderson**

s/c meeting held 1/13/19 → Attendees: Erik Anderson, Margaret Mathison, Mike Perevozchikov, Craig Bradshaw, Rick Heiden, Jun Lee, Andrew Brownell, Orkan Kurtulus, Davide Ziviani, Eckhard Groll, Guru Ravi. Meeting notes and plan as edited in the full committee meeting are shown below.

#### *Sponsored at Atlanta*

TC 8.01 co-sponsored 3 seminars at the conference in Atlanta

- Seminar 21, “Uncertainties in Compressor Performance and Field Performance of Liquid-Chilling Systems” well attended thanks to Matt Cambio, Joe Sanchez and Heinz Jurgensen
- Seminar 23, “Advances in Low-GWP Refrigeration System Architectures” session chair reports good speakers, with several good questions
- Seminar 33, “Low GWP Refrigerants: Components and System Designs” Full room

#### *Proposed for Kansas City*

- What’s loss got to do with it? Power Loss Analysis in Compressors...or rather bring me a parasite, Craig Bradshaw & Davide Ziviani as speakers, Margaret Mathison will chair. TC 8.02 voted unanimously to co-sponsor and offered to provide an additional speaker. TC 1.02 will also cosponsor.

**Motion:** Craig Bradshaw – Motion / Doug Collings 2<sup>nd</sup>.

**Vote: 10-0-0-2 CV**

#### *Ideas for Future*

- Compressor selections vs capacity, which one’s “the” right one - CRC vs ASHRAE vs Application best practice, Rick – may be best for a debate type for Orlando with 8.2
- What’s Oil got to do with it - Best practice for oil selection and qualification in positive displacement compressors, Rick – seminar with TC 3.4 for Orlando
- The influence of R410A replacement fluids on compressor technology selection – Craig, Rick – seminar tbd
- Oil management issues – oil logging using microchannel coils vs fin and tube coils, how do various compressor configurations influence oil circulation ratio (rates) – seminar with 8.11, 8.4, 1.3?
- VFD switching effect on compressor/motor performance
- Model based vs experimentally based loss analysis, Craig Bradshaw
- Compressor Protection Technologies – Flooded Start Protection Methods – Wendy Liu
- Advances in CO2 compression, Joe Sanchez (Chair/presenter), Scott MacBain, Stefan Elbel – Dr. Georgi Kazachki also offered to Chair

Research Subcommittee – Craig Bradshaw (Chair)

s/c meeting held 1/13/19 → Attendees: Erik Anderson, Margaret Mathison, Craig Bradshaw, Rick Heiden, Jun Lee, Andrew Brownell, Orkan Kurtulus, Davide Ziviani, Eckhard Groll, Guru Ravi. Meeting notes and plan as edited in the full committee meeting are shown below.

Update from Research Chair Breakfast

- Chris Seeton is section 8.1 r/l; 6 WS proposals 5 accepted; 1 sent back with comments; \$2.4M spend; Houston chapter recognized for its outstanding research promotion; Strong equipment/fundamentals based leadership in place at RAC

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

Note: TC 8.1 voted to support this RTAR in Atlanta 2015

- TC 8.2 decided at their Monday meeting to pursue resubmitting during next RAC cycle. No vote is required of TC 8.1 at this time.

Update on 2<sup>nd</sup> proposed research

Title: “Foamability properties of LGWP Refrigerant and Oil Mixtures”

Sponsorship: 3.4 (sponsor), 8.1 (co-sponsor)

Lead Author: Chris Seeton

Note: TC 8.1 voted to support this WS in Long Beach 2017, 6-0-0

Re-voted to co-sponsor updated WS in Chicago 11-0-0; no progress since then

Ideas

Effects of oil circulation ratio on direct refrigerant mass flow measurement devices – research in support of SSPC 41 supporting ASHRAE Std 23 – Davide Ziviani, Eckhard Groll

**Handbook – Michael Perevozchikov filling in for Alex Leyderman**

Discussion led by MP as

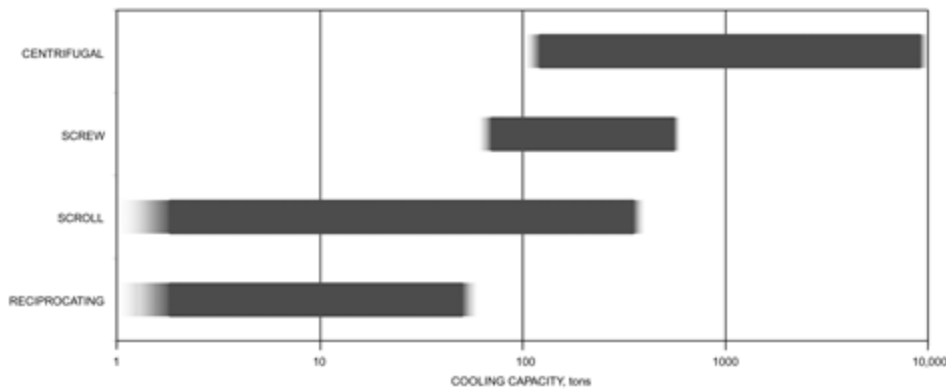
Chapter 38 was submitted to TC membership for review on 9/26. A vote was taken by letter ballot on November 18<sup>th</sup>, 2018. The letter ballot results were 10-0-0-2 CV to approve.

Chapter 43 was submitted to TC membership for review on January 6, 2019. No comments were received. A vote was taken at this meeting to approve.

**Motion:** Michael Perevozchikov / Scott McBain 2<sup>nd</sup> to approve chapter 43 as submitted by Alex Leyderman

**Vote: 10-0-0-2 CV.**

Note that Scott MacBain indicated Michael Perevozchikov will circulate proposed revisions being made by TC 8.02 in the general section of chapter 43 for comments for review by this committee. The figure is shown here for reference.



**Fig. 5 Approximate Liquid Chiller Availability Range by Compressor Type**

Discussion was held around holding additional meetings to review handbook sections along with forming a handbook specific subcommittee. Straw poll supported the concept and those volunteering for the s/c include: Amit Vaidya, Rick Heiden, Scott MacBain, Michael Perevozchikov

**ACTION ITEM:** - Michael Perevozchikov to contact Alex Leyderman on plans for proceeding.

#### **Membership – Michael Perevozchikov filling in for Jim Douglas**

We have 12 voting members at the time of this meeting

The Chair solicited interest by and CM's to become VM. Davide Ziviani requested consideration.

Research s/c chair – Davide Ziviani will replace Craig Bradshaw. The Chair thanked Craig Bradshaw for his service. Handbook s/c chair – Scott MacBain offered to solicit an alternate for this position

Michael Perevozchikov approved and will submit to TAC.

#### **Website – Doug Collings (Webmaster)**

The Chicago minutes on the website indicate draft but they are recorded as having been approved in the Houston meeting minutes. Current Chair confirms this was so and Webmaster is requested to update the website with final minutes.

Houston minutes as approved at this meeting should also be updated.

A basecamp will be established to support feedback on Functional Group initiatives.

**ACTION ITEM:** update Chicago meeting minutes with final approved version

**ACTION ITEM:** Upload approve Houston meeting minutes

**ACTION ITEM:** create basecamp

#### **Old Business – Michael Perevozchikov**

None.

**New Business - Michael Perevozchikov**

Discussion around formation of functional groups

*Ideas for grouping*

Grouping compressors seems natural such as 8.1 and 8.2. Although 8.2 includes chillers which could present issues. It was noted that 8.2 discussed combining with 8.1 during their TC meeting.

*Ideas in improve conference revenue*

Have seminars in the morning and TC's in the evening

Allow purchase of seminars via an APP

Better conference advertising, especially along with Expo

Has ASHRAE analyzed the participation rates versus the fee structure? It seems likely an optimal balance exists.

*I think we will have difficulty with?*

If s/c don't meet it reduces opportunities for non-members to participate

If 'super committees' are formed around a strong TC could dampen out the voice of lesser TCs.

Process agreed to at the meeting

MP will send TAC letter to all TC members

DC will set up a basecamp to gather voices

MP will consolidate to a single TC voice and submit to TC members for consideration

MP will set up a meeting for a TC vote

MP will submit to TAC as consolidated voice of TC 8.01

Individuals can submit forms as noted on the TAC letter

All feedback is due in 60 days

**Motion to Adjourn**

Motion to adjourn by Doug Collings, Michael Perevozchikov adjourned meeting at 5:20p

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

Sign In

Roster



TC8.1\_Roster\_Atlanta.pdf

Note: Double Click to open pdfs

TC 8.1 Attendance List – Atlanta

Name	Company	Status
Dr Michael Perevozchikov, PhD	Emerson	Chair / VM
Dr Craig R Bradshaw	Oklahoma State University	Vice Chair / Research/VM
Mr Rick M Heiden	Trane - Ingersoll Rand	Secretary/VM
Mr Erik S. Anderson	Anderson Engineering	Program/VM
Mr Doug Collings, PE	Tecumseh	Webmaster
Mr Eric Berg	Lennox Industries	VM
Mr Scott M MacBain, Sr	Carrier Corporation	VM
Mr John L Neel, PE	Johnson Controls Inc.	VM
Mr Joseph Sanchez	Bitzer US, INC	VM
Dr Christopher J Seeton	Shrieve Chemical Products	VM
Mr Stefan Elbel	University of Illinois	PCM
Mr Joshua Hughes	Chemours	PCM
Jun Pyo Lee	Carrier	PCM
Mr Justin Mark Prosser	AHRI	PCM
Dr Davide Ziviani PhD	Purdue University	PCM
Mr Matthew Cambio	Ingersoll Rand	CM
Dr Jason J Hugenroth	Inventerm	CM
Mr Dwayne L Johnson	Trane US Inc.	CM
Mr Heinz Juergensen	Bitzer	CM
Dr Georgi S Kazachki	Dayton Phoenix Group	CM
Ms Wenqian Liu	Lennox	CM
Wayne Beagle	Bitzer	Guest
Steve Rudy	Fandrich	Guest
Riley Barta	Purdue University	Guest
Raymond Good	Danfoss	Guest
Amit Vaidya	Carrier	Guest
Jetho Medina	Chemours	Guest
Andrew Brownell	Carrier	Guest
Josh Lavote	Carrier	Guest
Brandon Schwoeppe	Carrier	Guest
Justin Beers	Carrier	Guest
Emir Alemic	Carrier	Guest
Juergen Suess	Efficient Energy	Guest
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.