

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. 8.2 DATE 10-06-2020

TC/TG/MTG/TRG TITLE Centrifugal Machines

DATE OF MEETING 10-06-2020 LOCATION Online/Virtual

VOTING MEMBERS PRESENT	VOTING MEMBERS ABSENT	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Ray Good	Jeb Schreiber	Matt Cambio
Lindsey King	Dwayne Johnson	Steve Duda
Scott MacBain	Meagan Gibbs	Rick Heiden
Mark Rogan		Mark Adams
Justin Prosser		Drew Turner
Michael Perevozchikov		Dan Kemper
Trent Hunt		Steve Rudy
		Fred Betz
		Carlos Brignone

Date/Time: **Wednesday, June 10th, 2020 at 11:00AM – 1:00PM**
Location: **Online/Virtual**

MINUTES

- 1) Call to Order at 11:03 AM (EST) by Chair, Ray Good
- 2) Introduction of Attendees, Liaisons, Officers and Guests

6 of 10 voting members in attendance, Quorum achieved
- 3) ASHRAE Code of Ethics Commitment

As members of ASHRAE or participants in ASHRAE activities, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct. We will avoid conflicts of interest and behavior that is discriminatory and/or harassing. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)

- 4) Review of the Agenda – Chair
- 5) Reviewed TC 8.2 Mission Statement & Scope –
 - a) Involved in research outside of centrifugal compressor (vs 8.1)
 - b) Cover gas turbines? –
 - i) Consider for handbook addition – Currently in equipment handbook in a few sections
 - ii) May also want to cover in future program
- 6) Motion to continue, merge or dissolve –
 - a) Motion/2nd to continue
 - b) Discussion on coordination with TC8.1 – Merging subcommittees
 - c) Mention by Justin, now that he’s part of Danfoss, two voting members – Abstained on vote
 - d) Vote to continue – No objections (6/0/1)
 - e)
- 7) Section 8 leader/liaison – None attending
- 8) Reviewed/Approved Orlando Minutes (Winter meeting January 2020)
 - a) Change to date of meeting to 2020
 - b) Added Mark Rogan
 - c) Removed redundant Dan Kemper
 - d) Vote to approve unanimous with Justin abstention (6/0/1)
- 9) Reports:
 - a) Program M. Rogan
 - i) General issues with virtual program and pre-recording for Summer meeting
 - ii) Sound seminar with magnetic bearing compressors –
 - a) Approved, seminar #31
 - b) Trent as chair with JCI and BRD presenting (with help from Lindsey)
 - iii) Low-GWP refrigerants & their applications panel discussion
 - a) Not able to get presentations uploaded and recorded
 - b) Move to Chicago Winter meeting
 - c) Vote to sponsor for Chicago Meeting (6/0/1)
 - iv) Future topics – Better for them to fit in the listed tracks
 - a) CFD for Compressors–
 1. Lining up speakers from Emerson and JCI for Chicago
 2. Vote to sponsor for Chicago meeting unanimous with Justin abstaining (6/0/1)
 3. Seek co-sponsorship of TC8.1
 - b) “What makes a heat pump compressor a heat pump compressor?”
 1. Compare/contrast centrifugal & positive displacement.
 2. Davide Ziviani (TC8.1) volunteered to Chair
 3. Idea to also recruit Changiz Tolouee as a speaker
 4. Suggest that 8.1 sponsor and 8.2 co-sponsor
 - c) Standard 225 – Ray and Matt as potential speakers. Wait for 1520 release / coincide
 - d) Centrifugals in high lift – Combine with heat pump? Or, submit as subsequent / next phase.
 - e) Add Steam Turbine program idea
 - f) Program submission requirements discussion –
 1. Actual name and contact information
 2. 10 questions audience should be able to answer at the end
 3. Getting in early enough to not create ‘fire drill’
 - g) Hold off on last two to Phoenix meeting

- b) Research M. Adams
- i) Project 1677 –
 - a) Waterside fouling on internally enhanced tubes – Should finish soon
 - b) Testing complete
 - ii) Project 1716 –
 - a) Oil concentration of field-installed liquid chillers
 - b) Not one of the projects included in vote
 - c) ~1 year to execute
 - d) Focused on centrifugals only based on lack of 8.1 interest
 - 1. Too late to re-scope now
 - 2. Michael P. volunteering to re-visit with 8.1 including Rick H.
 - iii) Project 1793 – Development of Method of Test for motor component thermal conductivity
 - a) ~1 year to execute
 - iv) Research Projects’ status and additional details are in the research subcommittee attachment
 - a) Low-flow tube study
 - 1. Study on transition to laminar flow and implications of going to lower flow systems
 - 2. Question on new topics vs re-hashing previous
 - 3. No volunteer for RTAR – Idea to get someone from heat transfer?
 - v) Mark handing off chair of Research Sub-committee to Daryl Showalter but still stay involved in committee
- c) Handbook S. MacBain
- i) Still responsible for the 2 chapters (centrifugal compressors & liquid chilling)
 - ii) Scott now responsible for handbook for both 8.1 & 8.2
 - iii) 2020 changes now in updated handbook. Next renewals incorporated in 2024 handbook
 - iv) Fred B, Drew T, Rick H, Trent H and Steve D volunteering to participate for 2024 version
- d) Standards P. Johnson
- a) Wasn’t able to attend - per Phil email
 - b) Standard 30-2019
 - 1. TC 8.2 is cognizant and TC 8.5 co-cognizant. SPC30 continues, SSPC30 will hopefully be formally created with approval by Standards Committee during the summer virtual meeting. Addendum a was published end of May and available on the ASHRAE standards web site. SPC/SSPC30 is already working on another addendum.
 - 2. Additional addendums – Free cooling, adiabatic
 - 3. 550/590 future version will reference
 - c) Standard 184-2016 with Addendum a and errata sheet:
 - 1. TC 8.2 is cognizant and in Orlando took a vote to recommended reaffirmation. Standards Committee will be reviewing the recommendation during the summer virtual meeting.
 - d) Standard 225P – Method of test for centrifugal compressors
 - 1. TC 8.2 is cognizant. Requesting that Matt Cambio provide an update.
 - 2. Similar to positive displacement with a few modifications – Dual flow eliminated

- e) Guideline 22-2012:
 - 1. TC 9.1 is cognizant. GPC 22 is planning to conduct first publication public review of revisions (pending approval this month during virtual committee meeting).
 - f) Phil to provide full report in follow-up – Go direct to him with questions
 - g) ASHRAE 90.1 R. Heiden
 - 1. Independent substantive comment on new heating / heat pump efficiency requirements in combined system
 - (i) Change on meeting both requirements
 - (ii) Table 16-116
 - 2. K-adjust factor for non-standard conditions – Factor range expansion to 70F low-side and up to 135F high-side. Table 6412
 - 3. Clarify requirements on freeze protection fluid –
 - (i) Exemption clause for centrifugal chillers eliminated
 - (ii) For chillers designed for freeze protection fluid but operating with water
 - h) 1520P J. Prosser
 - 1. Method of test for centrifugal compressors
 - 2. Update not yet available but will be sent to Phil
 - i) 550/590 J. Prosser
 - 1. Use 30 as method of test (reference)
 - 2. Limitations on heat pump mode for no overlap with HP standard
 - 3. Issue with test rating conversion on EER vs kW/T
 - 4. Clean up text/table disagreements
- e) Membership L. King
- a) Issue with Ray and Justin both from same company as voting members
 - b) Justin agreement to not be voting member
 - c) Justin P to Justin S about becoming voting member as replacement
 - d) Megan Gibbs – Role change and will not be able to participate
 - 1. Ray suggestion for non-manufacturer replacement
 - 2. S. Duda to come back with potential recommendation from his firm or Steve Taylor's firm
 - e) Dwayne Johnson –
 - 1. Officially retired
 - 2. Determining replacement in-process
 - 3. Dwayne also handled webmaster
 - (i) Need replacement but no volunteers
 - (ii) Combine with Basecamp
 - f) Discussion on Secretary replacement – Trent H offering to 'help out'. No volunteer for future
- f) Awards/Recognition F. Betz
- i) No updates
 - ii) S. Duda – Lindsey receiving distinguished service award
- g) TC Chair Breakfast L. King
- i) Dates for TC leadership training
 - ii) Reach out to subcommittee chairs
 - iii) Refrigerant subcommittee reorganized
 - iv) COVID and HVAC design implications – Epidemic taskforce
 - v) In general, align spending with ASHRAE goals
- h) TC Reorg R. Good

- i) 4 mergers so far
 - ii) 3.2 & 3.3, 8.10 & 8.12, 9.4 & 9.8, 7.3 & 7.8
 - iii) TC8.1 and TC8.2 are not pursuing merging at this time. Will continue to work closely together in efforts like combined Program, Research, and Handbook subcommittee meetings.
- 10) Old Business - None
 - 11) New Business - None
 - 12) For the Good and Wellbeing
 - 13) Adjourn

Research S/C Chair Breakfast notes of interest

- Research Chairs breakfast is scheduled for July 16. Nothing to report today.

Current Activities

Research Subcommittee online meeting was held with Handbook & Program on June 4, 2020.

Project Status

- **1677 - Measurement and Prediction of Waterside Fouling Performance of Internally Enhanced Tubes in Cooling Tower Applications**
 - We are cosponsoring a study being undertaken by TC 8.5 on fouling of enhanced tubes. Looking at a smooth bore tube and multiple enhanced surface tubes. Scope includes testing, providing a model of the results, and a simulation calculation methodology. Report is under review by the PMS. Expect to publish in the next few months.
- **1716 - Oil concentration of field-installed liquid chillers with flooded type evaporators.**
 - WS was approved. This WS is ready to bid. It is on the list to release but did not go out in the spring. We hopefully will make it in the fall.
- **1793 - Development of Method of Test for Motor Component Thermal Conductivity**
 - We submitted, with co-sponsorship from TC8.1 and TC1.11, a WS for research of heat transfer of motor components for hermetic motors in refrigerant. This would develop correlations for motor manufactures to use for motor design.
 - We are going to resubmit.

Future Activities

We discussed possible new ideas for research at the on line meeting with some thoughts:

- HVAC components and new refrigerants.
- Low flow tube study.

These ideas will continue to be investigated. We will continue to solicit additional ideas.

Respectfully submitted,
Mark Adams
Research Subcommittee Chair
June 9, 2020

2020 Summer Meeting, Austin, TX now Virtual

Subcommittee Meeting: June 10th, 11:00 am -1:00 pm

Attendees: Mark Rogan, Mark Adams, Fred Betz, Drew Turner, Matt Cambio, Stephen Duda, Daryl Showalter, Phillip Johnson, Justin Prosser, Margaret Matheson, Michael Perevozchikov, Stefan Elbel, Trent Hunt, Davide Ziviani, and Ray Good

Austin or Virtual Meeting Update

1. **When is Quiet, Quiet enough? Understanding Sound Generation in Magnetic Bearing Centrifugal Chillers:** Trent Hunt is chair of seminar. Seminar submitted by TC8.2 and accepted. Further, presenters were able to submit presentations and record presentations by June 8th:
 - a. Patrick Marks, P.E. Johnson Controls and Kristan G. Kollevoll, BRD Noise and Vibration Control are presenters
2. **Low GWP Alternative Refrigerant Evaluations for Centrifugal Machines:** Panel Discussion format. Mark Rogan is chair of panel discussion. Submitted and approved but deadline for program submissions and recordings were not met for this virtual meeting.
 - a. Phillip Johnson with Daikin and Steve Kujak with Trane Technologies are presenters

Future Programs - Chicago

1. **Chicago recommendations:** Subcommittee recommends resubmitting the Low GWP seminar not accepted for the Austin or Virtual meeting for the Chicago winter meeting. Will require a vote of the committee.
2. **CFD for centrifugal compressors and fans:** Matt Cambio to chair. Had planned to coordinate with TC5.1 on fans but more recent discussion from Subcommittee meeting is to possibly ask TC8.1 to co-sponsor and supply a speaker for positive displacement compressor CFD. Matt was to secure a speaker from Trane on centrifugal compressors and Davide Ziviani volunteers to present on positive displacement compressors. A third speaker from Emerson was suggested and Michael Perevozchikov volunteered to reach out to them. Deadline for submission is 8/3.
3. **What makes a Heat Pump compressor a Heat Pump compressor?** Suggestion from Matt Cambio. Seminar would compare traditional positive displacement compressors with newly available magnetic bearing centrifugal compressors now also performing high lift duty. TC 8.1 would sponsor and TC 8.2 would co-sponsor. Davide Viviani offered to reach out to TC8.11 for additional co-sponsorship. Davide Viviani would also chair this seminar. Drew Turner volunteered to speak. Mark Rogan also volunteered to recruit a speaker from Trane Technologies.
4. **Standard 225; Centrifugal Chiller Method of Test compared to Standard 23.1** Justin Prosser to chair. Thought is to compare and contrast. Nick Zupp &/or Matt Cambio to speak. Can we possibly merge the two? This is also coinciding with AHRI 1520 and Justin Prosser suggested that we wait until the release of AHRI 1520 for which he will give us an update on timing.
5. **Dynamic Compression and High Lift Applications:** Trent Hunt made this suggestion. The thinking is to explore how newly available magnetic bearing high lift chillers are performing low-temp process and ice making applications. Committee should discuss the overlap between this topic and the heat pump topic which is program # 3. Can we combine perhaps?

2021 ASHRAE Winter Meeting Chicago:

Important dates:

1. Aug 3 Program submissions open
2. Sep 6 Program accept/reject
3. Dec 1 Powerpoint uploads begin

Future Program Ideas – Beyond Chicago

1. **High Efficiency Pumping and integrating variable flow pumping into high efficiency Chiller Plant models.** Pump TC could Co-Sponsor
2. **District Cooling Plants; What effect with R-123 retiring have on systems:** Co-Sponsor with District Cooling TC
3. **What impact has 90.1 – 2019 had on design practices regarding 15 degree delta T?**

Next Meeting

- Subcommittee will meet via conference call in Jan 2020

Respectfully submitted by:

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GBE
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June 10, 2020
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