# 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. 8.2 DATE 01-06-2024

TC/TG/MTG/TRG TITLE Centrifugal Machines

DATE OF MEETING 24 June 2019 LOCATION Kansas City MO

|  |  |  |
| --- | --- | --- |
| VOTING MEMBERS PRESENT | VOTING MEMBERS ABSENT | EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE |
| Forrest Yount | Meagan Gibbs | Tom Watson |
| Ray Good | Justin Prosser | Dan Kemper |
| Lindsey King | Konstantinos Kontomaris (NQ) | Matt Cambio |
| Phil Johnson |  | Mazharud Islam |
| John Vucci |  | Seth Yarborough |
| Dwayne Johnson |  | Scot Swan |
| Mark Rogan |  | Dan Russell |
|  |  | Ned Lawrence |
|  |  | Kezhen Shen |
|  |  | Nicholas Zupp |
|  |  | Scott MacBain |
|  |  | Michael Perevozchikov |
|  |  | Margaret Mathison |
|  |  | Mark Adams |
|  |  | Trent Hunt |
|  |  | Drew Turner |



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TECHNICAL COMMITTEE MEETING T.C. 8.2 CENTRIFUGAL MACHINES

Date/Time: **Monday, June 24th, 2019 at 2:15 PM – 4:15 PM**

Location: Marriott-West, 3rd Floor, Mary Lou Williams A, Kansas City, MO

### MINUTES

1. Call to Order at 2:17 PM by Chair, Forrest Yount
2. Introduction of Attendees, Liaisons, Officers and Guests

Voting Members not in attendance:

Konstantinos - Voting non quorum, not here

Megan Gibbs not here

Justin Prosser not here

6 of 9 voting members in attendance, Quorum achieved

 -Ray Good, Forrest Yount, Lindsey King, Drew Turner, Dwayne Johnson, Trent Hunt, Phil Johnson

Justin’s wife having a baby, congratulations!

1. ASHRAE Code of Ethics Commitment

In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)

1. Review of the Agenda – Chair
2. Reviewed TC 8.2 Mission Statement & Scope
3. Reviewed/Approved Atlanta Minutes (Winter meeting January 2019)

Trent moved, Phil seconded. All in favor (7-0-0), Minutes approved.

1. Reports:
	1. Program L. King

See attached sub-committee report for full minutes.

Kansas City: Cosponsored “What’s Loss got to do with it?”.

Ray attended. There was good attendance, but it was completely beyond Ray’s understanding because it was about positive displacement compressors.

Orlando 2020

We are on for Cosponsoring the Mag Bearing Noise Seminar in Orlando 2020.

8.1 Cosponsorship Ideas were turned into more positive displacement ideas, we won’t be cosponsoring:

“How do you select a compressor?” (Debate/Discussion)

Follow up Seminar to “What’s Loss got to do with it?”

Possible Plans for Orlando:

Low GWP refrigerant – Fell through, should revisit with new program subcommittee chair

There were other general ideas on:

Refrigeration for Comfort

Co-Sponsorship with Fans about CFD/FEA from a compressor point of view

High Efficiency Pump/System Program

1/6/19 Update: These were discussed but never followed up on. These should also be revisited, but need to make sure that one person can make sure the ideas happen.

* 1. Handbook D. Turner

Both chapters submitted and being implemented into next handbook,

Chapter is combined with Positive Displacement Compressors, Confirmation from Positive Displacement Compressor Handbook Chair that the Intro to the Chapter looks good and that both portions of the chapter will be integrated.

Thanks to the entire handbook subcommittee for your work in revamping the chapter!

* 1. Standards P. Johnson
		1. SPC 184 Update J. Vucci
		2. SPC 30 Update D. Kemper
		3. SPC 90.1 Update S. Hanson
		4. Guideline 22 update J. Vucci
	2. Research M. Adams

Research Projects’ status is in the research subcommittee attachment. Always looking for new research ideas, please keep thinking.

* 1. MTG Low GWP Liaison P. Johnson

This MTG approved co-sponsorship of resubmission of Low GWP Alternate Refrigerant Evaluations for Centrifugal Machines. We did not submit this though.

* 1. ~~MTG O&MEE J. Vucci~~

Disbanded – Will remove on future agendas.

* 1. Membership R. Good

New subcommittee chairs beginning July 1, 2019

Voting membership reviewed

Forrest Yount rolls off

Jeb Schreiber rolls on

Leadership positions reviewed

Updates:

Ray Good - Chair

Lindsey King – VC/Membership

Scott MacBain - Handbook

Mark Rogan – Program

Drew Turner - Secretary

* 1. Web Master D. Johnson

Website is up to date

* 1. Honors and Awards F. Betz
	2. Section 8 Chair’s Breakfast R. Good
1. Old Business
2. New Business
* Trent been assigned to an adhoc that works to focus on the “R” in ASHRAE, been tasked with making sure program include refrigeration, creating liasons to comfort, industrial, cold chain subcommittees. Reports to tech Council.
* ASHRAE has been looking for ways to “revamp” organization to better use Members’ time.
* Section 8 Head came by, TC activity form due Tuesday night. Dustin will send us roster as PDF, need to review and send Dustin any issues with the roster asap (Ray sent issues to Dustin, but they have not been corrected.)
* TC consolidation still happening but delayed
* Congrats to Forrest for serving as chair, And thank you for your service and setting Ray up for success.
1. For the Good and Wellbeing ….
2. Adjourn



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**TECHNICAL COMMITTEE MEETING**

**T.C. 8.2 CENTRIFUGAL MACHINES**

Time: **Monday, June 24, 2019 2:15 PM – 4:15 PM**

Location: **Kansas City, MO**

**TC 8.2 Program Subcommittee**

Kansas City:

* Co-Sponsoring Seminar 19: What’s Loss Got to Do With It? Analysis of Indicator Diagrams of Positive Displacement Compressors

Sunday, 6/23 1:30-3:00PM; Room: 2104B

* Was anyone able to attend?
* Completely beyond understanding Ray
* 8.1 Program Cosponsor

Orlando, Winter 2020:

* Cosponsoring Mag Bearing Noise Seminar,
* TC 2.6 will provide speakers, Mark Neufcort from 8.2 to Chair. Is this happening?
* We approved to cosponsor “How do you Select a Compressor?” Debate/Discussion of Compressor Type vs Application. 8.1 is still finalizing the Exact Idea and will let us know.
* How refrigerants were being used and how does the application ranges change
* TC 5.1 Fans reached out to us for co-sponsorship. They’re looking for speakers on CFD/FEA from a compressor point of view.
* Matt Cambio reached out about a speaker for CFD. No ideas were sent in.

Future Ideas:

* Phil found a speaker for Seminar 19, but Margaret Mathison felt that this would be better with a follow up seminar.
* Idea for High Efficiency/Pump System proposed: Pump TC did not reach out about this. Will keep Idea for future use.
* Low GWP Refrigerants in Centrifugal Machines was proposed and received cosponsorship approval from MTG.LowGWP, but we didn’t submit.
* District Energy TC cosponsor, 123 going away and changes it’s going to make, with TC 6.2.
* Danfoss and JCI can potentially find a speaker, chair to determine title and speakers.
* Model with Validation Testing, System Modeling (Centrifugal Compressor component), could go in Cutting Edge approach Track.

**Orlando; Winter 2020 Deadlines and Tracks**

**HVAC&R Fundamentals and Applications:**

**Systems and Equipment:**

**Refrigeration and Refrigerants:**

**Cutting Edge Approaches:**

**High Efficiency Design and Operation:**

**Big Data and Smart Controls:**

**Ventilation, IAQ and Air Distribution Systems:**

**Standards, Guidelines and Codes:**

**Deadlines:**

**Monday, June 17, 2019:** Website Opens for Seminar, Workshop, Forum, Debate, and Panel Proposals
**Monday, July 8, 2019:** Final Conference Papers Due - Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment); Request for Conference Paper Sessions Due
**Friday, July 26, 2019:** Conference Paper Accept/Revise/Reject Notifications
**Friday, August 2, 2019:** Seminar, Workshop, Forum, Debate, and Panel Proposals Due
**Friday, August 9, 2019:**Revised Conference Papers/Final Technical Papers Due
**Friday, August 26, 2019:**Conference and Technical Paper Final Accept/Reject Notifications
**Friday, October 4, 2019:**Seminar, Workshop, Forum, Debate, and Panel Accept/Reject Notifications



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Location: **Kansas City, MO**

**Standards Subcommittee STATUS REPORT**

**Standards**

TC 8.2 is the cognizant TC for:

* Standard 30-2019 Method of Testing Liquid Chillers

[TC 8.2 is lead; TC 8.5 is co-cognizant]

2017 edition was published in 2017, published under periodic maintenance

Committee was forced to published or perish

2019 was published under continuous maintenance

Can now be added addended

Now has been formed as sspc, working on addendum A

They are seeking additional members

Looking for volunteers

Dan kemper spoke on:

Working on thermal

Verbal to operational setpoints

P adjust data template

Definitions to new equipment types

How to incorporate component testing into method of testing

* Standard 184-2016 Method of Test for Field Performance of Liquid-Chilling Systems

Success story! Disbanded committee because they finished the job

This TCs decision to figure out next steps. 3 Options:

Enough interest to revise? Can start this anytime, but there is some required paperwork, and need for a chair and committee members

2023 final deadline to with draw or make obsolete

5 years cycle from addendum A

TC 8.2 also monitors activity for the following standards of interest to members:

* Guideline 22-2012 Instrumentation for Monitoring Central Chilled-Water Plant Efficiency

[TC 9.1 is cognizant]

* Standard 90.1-2016 Energy Standard for Buildings Except Low-Rise Residential Buildings

[TC 7.6 is cognizant]

**SSPC 30**

* Standard 30-2017 was published under periodic maintenance (5 year cycle) by SPC 30
* Standard 30-2019 was published under continuous maintenance (addenda at any time, combined into new edition every 3 years)
* SPC 30 converted to SSPC 30
* Now working on ***Addendum a***
* Could use additional members for General and User interest categories

**SPC 184**

* Disbanded in 2019 after December 2018 publication of ***Addendum a*** to Standard 184-2016.
* TC 8.2 needs to decide when to form another committee, if there is interest to revise the standard (e.g. additional work on the uncertainty calculator spreadsheet workbook).
* Absolute deadline to decide to Reaffirm or Withdraw the standard is December 2023 (5 year cycle from last publication), but if choosing to Revise the standard can start at any time.

**GPC 22**

* Guideline 22-2012 was published with editorial updates to references
* GPC 22 is drafting an update, work plan was to put out for PPR1 during 2019 (but slightly behind schedule)
* Phil heard back title purpose scope changed, approved in Kansas City

**SSPC 90.1**

* Standard 90.1-2016 with many addenda
* 2019 edition to be published this year; no changes to centrifugal chiller minimum efficiency requirements; change to the chilled water coil ΔT

**Other**

* In January 2019 (Atlanta) Rick Heiden proposed standard for motor insulation materials. TC 1.10 likely to be cognizant. TC 8.2 expressed general interest and support.

**225**

**We are cognizant TC for this one**

**226p,22.1, looking for mass flow questions**

Respectfully Submitted,

Phillip Johnson,

TC 8.2 Standards Subcommittee

TECHNICAL COMMITTEE MEETING

T.C. 8.2 CENTRIFUGAL MACHINES

**TC 8.2 Research Subcommittee Report** June 24, 2019

2019 ASHRAE Annual Meeting, Kanas City, Missouri

**Research S/C Chair Breakfast notes of interest**

* RAC evaluated 6 RTAR’s – 1-Accepted; 2 - Accepted with comments; 3 - Rejected.
* RAC reviewed 13 work statements – 1-Accepted; 5 -Accepted with comments; 7 - Returned.
* David Yashar is becoming Chair of RAC.
* ASHRAE is rolling out a new program for funding of development of Publications. This will mirror the current research methodology. The initial form is a Publication Topic Acceptance Request (PTAR) which is similar to the RTAR. These will require a strong case as to why it cannot be generated within normal ASHRAE business practices.

**Current Activities**

Research Subcommittee online meeting was held with Handbook & Program on May 30, 2019.

Attendees: M. Adams, F. Yount, L. King, D. Kemper, D. Turner, J. Prosser, M. Rogan, M. Perevozchikov, S. Duda, R. Good, & P. Johnson.

**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. Testing is continuing and collecting data. The 6th of 6 conditions is starting. Testing will conclude in January and final report will be complete next June.
* **1716 -** **Oil concentration of field-installed liquid chillers with flooded type evaporators.**
	+ WS was submitted to RL. Ready to release to bid when he has approved after this meeting. Possibly in the fall but more likely in the spring due to funding.
	+ Bumping up against time deadline, when trent sees
	+ Combine subcommittee handbook, program, research
	+ Going to find joint 8.1/8.2 meeting, suggest a few slots to meet with subcommittees of 8.1
* **1793 - Development of Method of Test for Motor Component Thermal Conductivity**
	+ We submitted, with co-sponsorship from TC8.1 and TC1.11, an RTAR 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 discussed this at the Research Chairs Breakfast this AM. Our RL wants to review and hold a call after this meeting and determine what changes to make to resubmit. If substantial changes are required it will need to be re-voted by the TC.

**Future Activities**

* We discussed possible new ideas for research at the on line meeting but no new ideas were generated. We will continue to solicited additional ideas.

Chairs from 8.1 and 8.2 to get togethers and find subcommittee time

Respectfully submitted,

Mark Adams

Research Subcommittee Chair

June 24, 2019



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Time: **Monday, June 24, 2019 2:15 PM – 4:15 PM**

Location: **Kansas City, MO**

**MTG.LowGWP STATUS REPORT**

**Activity areas of this MTG:**

* Initiating, monitoring & summarizing research efforts, specifically the on-going collaborative research effort for flammable refrigerants
* For codes & standards, providing a forum for organizing advocacy & outreach efforts
* Planning seminar(s) for technical programs
* Encouraging development of LCCP models ( where the TC got started)
* Have a program chair to get programs out there to society

**Meetings**

MTG.LowGWP held meetings as follows:

* 13, 16 Jan-2019, Atlanta, GA
* 23-Jun-2019, Kansas City
* 26-Jun-2018, Kansas City (*planned*)
* interim meeting(s), Fall 2019 *(if needed)*
* 2, 5 Feb-2020, Orlando, FL *(planned)*

**Technical Programs**

TC planning to submit technical program proposals can ask MTG.LowGWP to co-sponsor. If you missed one of the sessions below, use the virtual conference to watch it after the conference.

Kansas City programs (co-)sponsored by MTG.LowGWP:

Seminar 44, ASHRAE Research Overview for Lower GWP Flammable Refrigerants

other Kansas programs related to lower GWP refrigerants:

Seminar 11, Optimization for Next Generation Systems

Conference Paper Session 10, Alternative Refrigerants: Low GWP Refrigerants and Ionic Liquids

**Codes & Standards**

Activity of interest to TC 8.2 include a stakeholder list that was developed to assist with discussion and planning, and an advocacy/education/outreach plan being developed to assist with transfer of research results into building codes and product safety standards. A white paper was completed in May 2019 “Transition to A2L Low GWP Refrigerants”, currently available for use within ASHRAE committees (wider distribution after review & approval). A presentation slide deck is under development.

Meet Tuesday afternoon

**Research**

Research projects of interest to TC 8.2:

 *[note: completed research project final reports are available at ASHRAE* [*research web site*](https://www.ashrae.org/standards-research--technology/members-only-research-reports-redirect) *]*

**RP-1794:** White paper investigation relating to the use of odorants in flammable refrigerants. Sponsored by TC 3.1. Project completed January 2019 & published March 2019.

**RP-1800:** Spray Evaporation on Enhanced Tube Bundles with Low GWP Pure Refrigerants and Refrigerant/Miscible Oil Mixtures. MTG.LowGWP co-sponsoring with TC 1.3. Contract awarded to Auburn University. Started Sep-2018. Planned duration 30 months (Feb‑2021).

**RP-1806**, Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update

Status: Gexcon US is contractor, project started on Jan-2017. Task 1 draft report now in review & approval. A pilot study with a subset of Task 2 and Task 3 expected start July 2019. Decision point after the pilot to proceed with remainder of project or not. 2nd larget ashrae project ever

**RP-1807**, Guidelines for Flammable Refrigerant Handling, Transporting, Storing and Equipment Servicing, Installation and Dismantling

Status: Navigant Consulting is contractor. Final report approved December 2018, published/released early February 2019.

**RP-1808**, Servicing and Installing Equipment using Flammable Refrigerants: Assessment of Field-made Mechanical Joints

Status: Creative Thermal Solutions is contractor. Revised draft report under review for final approval, approval and publication expected by early July 2019.

Highlighted are part of seminar tomorrow

**WS-1855**, Determination of the Impact of Combustion Byproducts on the Safe Use of Flammable Fluorinated Refrigerants

Status: RAC sent WS back with comments Spring 2019. MTG revised and approved for re-submittal in Kansas City.

**RTAR/WS-1884**, topic under development by TC 3.1, investigating odorants for flammable refrigerants (follow up project from RP-1794)

**Voted on behalf of TC 8.2 to support this research project**

Status: In Kansas City, MTG.LowGWP voted to offer co-sponsorship to TC 3.1.

**LCCP**

**Nothing really new according to phil, links provide for information**

International Institute of Refrigeration (IIR) formed a working group (WG) to assess the merits of different methods for evaluating the Life Cycle Climate Performance (LCCP) for refrigerating systems environmental impact of refrigerants and to produce implementation protocols for these methods, for use by decision makers and refrigeration stakeholders.

WG name: “IIR Working Group on LCCP Evaluation”. Nine (9) Working Party meetings have been held to date, the most recent was August 2016. Meeting documents are available online at the [IIR web site](http://www.iifiir.org/medias/medias.aspx?INSTANCE=EXPLOITATION&PORTAL_ID=portal_model_instance__WP_LCCP_Evaluation.xml&SETLANGUAGE=EN).

Updated LCCP guideline document (v1.2) was published after the January 2016 meeting, which includes recommendations for chiller related inputs to a LCCP calculation. During mid-2016 an addendum was prepared by the WG. A final document was expected late 2016 but not yet published.

<http://www.iifiir.org/userfiles/file/about_iir/working_parties/WP_LCCP/08/Booklet-LCCP-Guideline-V1.2-JAN2016.pdf>

**Membership**

Current MTG.LowGWP representation from TC 8.2:

**Primary:** Phil Johnson

**Alternate #1:** Ray Good

**Alternate #2:** (*open if there is interest*)

**There’s no limit to the number of alternates, but must go through the TC roster update list. If anyone is interested, let chair know**

Other TC representation: 1.1, 1.3, 2.5, 3.1, 3.2, 3.3, 3.4, 3.8, 6.3, 8.2, 8.4, 8.5, 8.7, 8.11, 10.1,10.7.

Other SSPC representation: 15, 34.

Other organization representation: AHAM, AHRI, UL, UNEP.

Respectfully Submitted,

Phillip Johnson,

TC 8.2 Representative to MTG Alternative Lower GWP Refrigerants

For Reference:

https://www.ashrae.org/technical-resources/technical-committees/section-mtg-multidisciplinary-task-groups

**MTG: Alternative Lower GWP Refrigerants**

**Scope**

MTG.LowGWP will coordinate TC/TG/TRG technical activities to help transition the HVAC&R industry to sustainable lower Global Warming Potential (GWP) alternative refrigerants. The MTG will further request participation from US DOE, AHRI, and others with shared goal. The MTG responsibilities include research, development and presentation of technical programs of all types on alternative lower GWP refrigerants, suggestions for Life Cycle Climate Performance (LCCP) systems evaluation for different applications, development of lower GWP solutions for different applications, and a special publication detailing aspects of LCCP applied to the HVAC&R fields.

**Objective/Impact**

This MTG will create a synergy between TCs working on advancing the HVAC&R state-of-the-art. The Members will coordinate the efforts undertaken by TCs 1.1, 1.3, 2.5, 3.1, 3.2, 3.3, 3.4, 3.8, 6.3, 8.2, 8.4, 8.5, 8.7, 8.11, 10.1, and 10.7 plus SSPC 15, SSPC 34 and the work of AHAM, AHRI, U.L., and UNEP to investigate the performance of alternative refrigerants and refrigerant blends proposed by TC 3.1. The MTG will also work closely with TC 3.2 and TC 3.4 to ensure the compatibility of the new refrigerants with current and future systems. Furthermore, the MTG will coordinate the results obtained from research performed in different TCs with TCs 1.5, 2.5 and 4.1 to establish a standardized LCCP evaluation in order to ensure that the lower GWP refrigerants do not contribute more emissions indirectly. Results from the work coordinated by this MTG will be published in ASHRAE handbook chapters sponsored by different committees. The diversity of the MTG participating TC membership will result in stronger impact on the HVAC&R community and ensure faster and sustainable transition to environmentally friendly refrigerants.