ASHRAE TC 9.10 Laboratory Systems
Virtual (Winter 2021)
Thursday, January 28, 2021
Meeting Minutes

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
1791 TULLIE CIRCLE, N.E./ATLANTA, GA 30329
404-636-8400

TC/TG/TRG MINUTES COVER SHEET

TC/TG/TRG NO	9.10	DATE	January 28, 2021
TC/TG/TRG TITLE	Laboratory Systems		
DATE OF MEETING	January 28, 2021	LOCATION	Virtual

Voting Members Present	Term Expires	Members Absent	Term Expires	Ex-officio members and additional attendance
Guy Perreault (Chair)	2022	Jason Atkisson	2021	Robert Weidner
Brad Cochran	2022	Eric Ballachey	2023	John Castelvecchi
Christine Reinders-Caron	2023	Patrick Carpenter	2021	Lou Hartman
Kenneth Kuntz	2021	Jacob Edmondson	2022	Gaylon Richardson
John Varley	2024	Mary Foutz	2023	Adam Bare
Glenn Friedman	2024	Lloyd Le	2023	Jim Coogan
Brent Fullerton	2022			Roland Charneux
Kishor Khandari	2024			Kelley Cramm
Tom Smith	2021			Ken Crooks
Martin Stangl	2023			Darryl DeAngelis
				Dan Frasier
				Gary Goodson
				Charles Henck
				Mark Malkin
				Duncan Phillips
				Gordon Sharp
				Wei Sun

				Peter Rawls
				Keith Hammelman
				Tim Mathson
				Matthew Nesbitt
				Heather Schopplein
				Wade Conlan
				Gary Roepke
				Matt Gaedtke
				Rachel Romero
				Chris Kirchner

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DISTRIBUTION

All Members of TC/TG/TRG plus the following:	
TAC Section Head: Vance Payne	
TAC Chair: Dustin Eric Jason Meredith	
All Committee Liaisons As Shown On TC/TG/TRG Rosters:	
Standards Liaison: Rick Heiden Manager of Research & Technical Services: Mike Vaughn	
Research liaison: Paolo Tronville	

Call to order 3:00 PM / Introductions

Guy gave introduction to TC9.10 and reviewed high level objectives. Reviewed Code of Ethics.

Introduction to TC9.10 website and Basecamp. Jim Coogan is web master. Roles and responsibilities are on the website.

Skipped individual introductions because of virtual meeting, participants could see participants list.

Reviewed Current Leadership and Follow-on leadership.

Currently there are 16 voting members – preference is to have mix of manufacturers, owners, consultants, and contractors.

Quorum is met 10 members present.

Membership Update (Brad Cochran)

Current Leadership

Chair – Guy Perreault
Vice-Chair – Robert Weidner
Secretary – John Castelvecchi

Rolling off June 30, 2021

- Ken Kuntz
- Jason Atkisson
- Tom Smith
- Patrick Carpenter

Rolling on July 1, 2021

To be determined next week

Approval of Virtual meeting minutes (Guy Perreault)

- Minutes from the 2020 Annual Virtual meeting were emailed previously.
- Comments on 2020 Annual Virtual Minutes:
  - None
- Move to approve with edits: Ken Kuntz moved; Christine Reinders-Caron seconded.
  - Approved 9-0-0, CNV.

Section Head Report (Brad Cochran)

- Update on ETF Lab subcommittee
  - Published on ASHRAE website

Program Subcommittee (Christine Reinders-Caron)

- See sub-committee report attachment.
- 13 attendees
- 2 sponsored programs
- 1 Co-sponsored debate
- February 22nd is deadline for program seminars for Phoenix.
- Conference Paper abstracts due March 22nd for Las Vegas
- Program template is on basecamp.

Research Subcommittee (Bob Weidner)

- See sub-committee report on attachment.
- 18 in Attendance
- RP-1576 Gas replacement project completed April 2020
- RP 1780 – Test Method to develop a Methodology to Evaluate Cross Contamination of Gaseous Contaminants within Total Energy Wheels – Project was awarded to University of Saskatchewan. Deadline now March 1, 2022 due to Covid.
- Work statement 1835 Characterizing the Performance of Entrained Flow Stacks– was bid but unresponsive. Updated WS, will rebid later
- RP 1833 on Air Changes ongoing.
- Talked about research on 3D printers.
- Talked about DCV in labs and sensors.
- Talked about ventilation Effectiveness.
- Talked about use of Analytics in Labs, need someone to work on RTAR.

Laboratory Classification (Adam Bare)

- See attached minutes
- 15 in attendance

- Need to get word out about the Lab Classification Guide.
- Looking for new Subcommittee Chair, contact Guy Perreault.

Standard 110 (Tom Smith)

- Meeting to define needs and areas of modifications.
- Work Groups formed and assigned areas.
- Meeting February 5, 2021 at 3:00 pm.

Laboratory Design Guide (Ken Kuntz)

- See attached minutes.
- 20 attendees
- Working on Guide a little of 2 years
- Chapters Complete
    - Chapter 3: Design Process
    - Chapter 5: Laboratory Hood Design-may re-open
    - Chapter 11: Controls
- Working on editing 6 more chapters.
    - Chapter 4: Laboratory Planning
    - Chapter 9: Exhaust Stack Design
    - Chapter 12: Airflow Patterns and Testing Procedures
    - Chapter 16: Microbiological and Biomedical Laboratories
    - Chapter 17: CFD Modeling of Laboratory Ventilation
    - Chapter 18: Sustainable Design
    - Chapter 20 (new): Ventilation Effectiveness

Handbook Subcommittee (Lou Hartman)

- Over a year to go, due mid 2022.
- Reviewed topics for update today.
- Need to Update
    - Controls Section
    - Diversity and Usage Factors – define.
    - Fume hood terminology updates
    - Commissioning section
- Handbook versus Design Guide – Need to research what should be in each.

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Journal (Roland Charneaux)

- Two articles since Annual meeting

ALI Courses (John Varley)

- Lab Design – Looking for someone to give the class – reach out to John Varley
- Lab Exhaust - Given twice online by Brad Cochran in August and December
- Lab Controls – Under development, need to get paperwork to ASHRAE. Need to add equipment and safety monitoring at front end.

Liaison Reports

- TC 1.4 Control Theory & Applications (Jim Coogan)
  - Adding Sequences to Guideline 36 not moving anywhere at this time.
- TC 2.2 Plant and Animal Environment (Henry Hays)
  - Not Report
- TC 4.3 Ventilation and Infiltration (Martin Stangl)
  - Comparison of wind total and CFD modeling
  - No supporting data for CFD dispersion Modeling.
- TC 5.1 Fans Systems (Brent Fullerton)
  - Co-sponsoring Research Project 1835 on Exhaust to Intake Dilution.
- TC 5.3 (Kishor Khankari)
  - Air contamination and white paper
- TC 7.6 Building Energy Performance (Pat Carpenter)
  - No Report
- TC 7.9 Commissioning (Need Liaison)
  - No Report
- TC 9.6 Healthcare (Traci Henegan)
  - No Report
- TC 9.7 Educational Facilities
  - Working on ETF for Reopening schools
  - Classification of labs in University
  - Maker Spaces
- TC 9.11 Clean Spaces (Roland Charneux)
  - RP 1604 Variable flow for Cleanrooms almost completed.
- MTG ACR (Kishor Khankari)
  - Debate on ACH or Ventilation Effectiveness
- Standard 62.1 Ventilation for IAQ (Brendon Burley)
  - No Report
- 90.1 Energy Efficiency (Jason Atkisson)

  - No Report
- SMACNA
  - No Report
- NFPA 45 (Ken Crooks)
  - NFPA45 committee has re-entered the revision cycle and is active on updates for the 2023 version.
  - Public input period has closed, the committee will meet again in mid-May for two day discussion of the 2023 first draft.
  - Beyond public input, the major revision being worked on is the addition of Ductless fume hoods / ductless ventilated enclosures. A task group has been assembled and meets frequently to recommend language at the committee meeting in May.
- NSF
  - No Report
- ISPE
  - No Report
- AIHA/ASSE Z9.5 (Gordon Sharp)
  - Trying to complete standard, will expire if not updated.
  - Need draft in a couple of months.
- I2SL (Gordon Sharp)
  - Virtual conference in October
  - Conference in Atlanta September 26th to 29th in Atlanta

Old business

- None Reported

New business

- If interested in becoming a voting member contact Guy Perrault (need new members by 2/5/2021).
- June 26th-30th – Next meeting in Phoenix

Main Meeting adjourned at 4:20 pm.

ASHRAE TC 9.10 Laboratory Systems Virtual Program Sub Committee
Wednesday January 27, 2021 11:00AM EDT
Meeting Minutes

Program Sub Committee Meeting, Virtual Meeting Winter 2021

Attendees:

Christine Reinders	Tom Smith	Jim Coogan
Peter Rawls	Roland Charneux	Brad Cochran
John Castelvecchi	Gary Goodson	Robert Weidner
Gaylon Richardson	Kelley Cramm	
Ken Crooks	Guy Perreault	

Virtual Programs

Sponsored Programs
Seminar 1: What's in your Toolkit? Laboratory Efficiency for Cutting Edge Labs
Chair: Jason Atkisson
LIVE – Tuesday February 9, 10:30am-11:30am EST

Seminar 71: New Dogs, New Tricks: Air Flow Control Update
Chair: Jim Coogan
On Demand

Co-Sponsored Programs
Debate 1: Air change per hour (h-1), cfm/ft2, or something else? – Kishor Khankari
LIVE – Wednesday February 10th 12:00pm – 1:00pm EST

Future ASHRAE Conferences
June 26-30, 2021 – Phoenix, AZ – Technical Chair – Christine Reinders
January 31- Feb. 2, 2022 – Las Vegas, NV – Technical Chair - Raul Simonetti
June 25-29, 2022 – Toronto, ON - Technical Chair – Ryan MacGillvray

Chair Notes: Program Submissions for Phoenix are now due February 22nd, 2021

From Publications: TC authors may find it a daunting task to put the effort into putting material together for a Special Publications book, especially to time it takes. Please think of writing an article for the ASHRAE JOURNAL instead. Your content will not take as long to develop and will get to your audience quicker. You might get feedback on your topic that will lead to taking the time to create a special publication. If you have any questions regarding publishing in the ASHRAE JOURNAL contact Sarah Foster, Editor.

Phoenix Deadlines 2021 – June 26 - 30, 2021

Wednesday January 13, 2021: Revised Conference Papers/Final Technical Papers Due
Monday February 15, 2021: Extended Abstracts Due
Thursday February 18, 2021: Conference and Technical Paper Final Accept/Reject Notifications
Monday February 22, 2021: Program Submissions Due
Friday March 19, 2021: Extended Abstract Accept/Reject Notifications
Friday April 2, 2021: Program Submission Accept/Reject Notifications

ASHRAE TC 9.10 Laboratory Systems Virtual Program Sub Committee
Wednesday January 27, 2021 11:00AM EDT
Meeting Minutes

Potential Sessions

Phoenix

- Carol Donovan – Mike McCloud University of Phoenix
- Roland Charneux & Kishor Khankari - MTG.ACR – Air Change Rates – Co sponsor
  - With James Bennett & Travis English
- Fume Hood Testing - Chair Robert Weidner
  - Tom Smith - Results of Research RP1573
  - ASHRAE 110 Revisions - Jim Coogan
  - European / International Standards – Brad Cochran
- Kishor - Room mixing/ Airflow patterns (with TC 5.3)
- Beyond Preventative maintenance - to data driven maintenance in critical environments
  - Chair Jim Coogan
  - collaborate with Controls / Cx / Analytics /APPA Presentation / TC 7.3
- BAS & Equipment Provided controls – Lab exhaust fans/systems/ air valves
  - co-sponsor with TC 1.4 – Jim Coogan
- Z9.5 Standard updates – Jim Coogan Chair

Future Consideration

- Tom Smith - Forum on: Risk based Use of Lab Classification Guide & Method of Risk Assessment with someone from IAHA
- Static Pressure optimization
- Lessons learned from the current pandemic – importance of airflow and airflow pathogens –Explaining mixed air
- Research on exhaust of 3D Printers
  - Collaborate with Environmental Health & TC4.3 – Martin Stangl
- Martin Stangl – Lab Design in Canada & the US Code differences in same climate zone
- Ken Kuntz – Design Guide – Workshop by Chapter

Speaker Resources
https://www.ashrae.org/conferences/speaker-resources
https://www.ashrae.org//File%20Library/Conferences/Speaker%20Resources/SpeakersManual_0718.pdf

Phoenix Tracks & Track Chairs

1. **Fundamentals and Applications - Sonya Pouncy - sonyapouncy@gmail.com**
2. **HVAC&R Systems & Equipment - Rupesh Iyengar - rupesh_iyengar@yahoo.com**
3. **Research Summit - Kristen Cetin - cetinkri@msu.edu**
4. **Professional Development - Marites Calad - mcalad@norman-wright.com**
5. **Design, Control, and Operation of Critical Environments - Raul Simonetti - raul.simonetti@carel.com**
6. **HVAC&R for Indoor Plants & Animals - Ryan MacGillvray - ryan.macgillivray@dwel.com**
7. **Future Proofing - Renewable, Regenerative, Resilient - Andy Cochrane acochrane@industrialairinc.com**
8. **Hot, Hot, Hot - Nohad Boudani - nohadb@inco.com.lb**

ASHRAE TC 9.10 Laboratory Systems Virtual Program Sub Committee
Wednesday January 27, 2021 11:00AM EDT
Meeting Minutes

Las Vegas Tracks & Track Chairs

1. **Fundamentals and Applications:** Robert Cox
2. **HVAC&R Systems and Equipment:** Anoop Peediayakkan
3. **Refrigeration & Refrigerants:** George W Austin
4. **Environmental Health Through IEQ in the International Arena**: Som S Shrestha
5. **Buildings at 360°:** Arthur L Giesler
6. **Energy System Integration:** Farhan Adil Mehboob
7. **HVAC for Industrial and Commercial Purposes – Challenge & Opportunities:** Bert Phillips
8. **Mini-track at AHR Expo** – Refrigerant Safety & Performance – Gary Debs

Las Vegas Deadlines 2022

- **March 22, 2021**: Conference Paper Abstracts, Technical Papers due
- **April 19, 2021**: Conference Paper Abstract Accept/Reject Notifications
- **June 18, 2021:** Website Opens for Program Proposals
- **July 12, 2021**: Conference Papers Due
- **August 23, 2021**: Conference Paper Accept/Revise/Reject Notifications

ASHRAE 9.10 Research Subcommittee Meeting Agenda & Current Work Status
January 27, 2021

Research Projects:

RP 1573 – SF6 Replacement Gas Project Status (Tom Smith – 3Flo)

1. Research Project was completed in April 2020 and TC 9.10 approved via electronic vote.
2. Plan to include research findings in Seminar at Summer Meeting (Phoenix)
3. Tom is working with ASHRAE 110 committee to build upon the research for developing a round robin testing program.
4. ***Conclusion/Path Forward: Method proposed is good methodology; working on testing setups that are cost effective and repeatability.***
5. ***Report available on Technology Portal – re: 1573; Login separately to portal***

RP 1780 (Test Method to develop a Methodology to Evaluate Cross Contamination of Gaseous Contaminants within Total Energy Recovery Wheels) – Roland C.

1. Project RP 1780 was awarded to University of Saskatchewan.
2. We have had three meetings with U of S but due to the loss of a researcher, issues with Covid-19 pandemic and getting a new researcher the project schedule has been extended to March 1, 2022. To date the work has included literature research (still on-going) and 1st test stand near complete.
3. The PMS includes: Bob W. (Chair), Roland C. (WS Author), Nick Agopian, Brendon Burley, Hoy Bohannon

Work Statements:

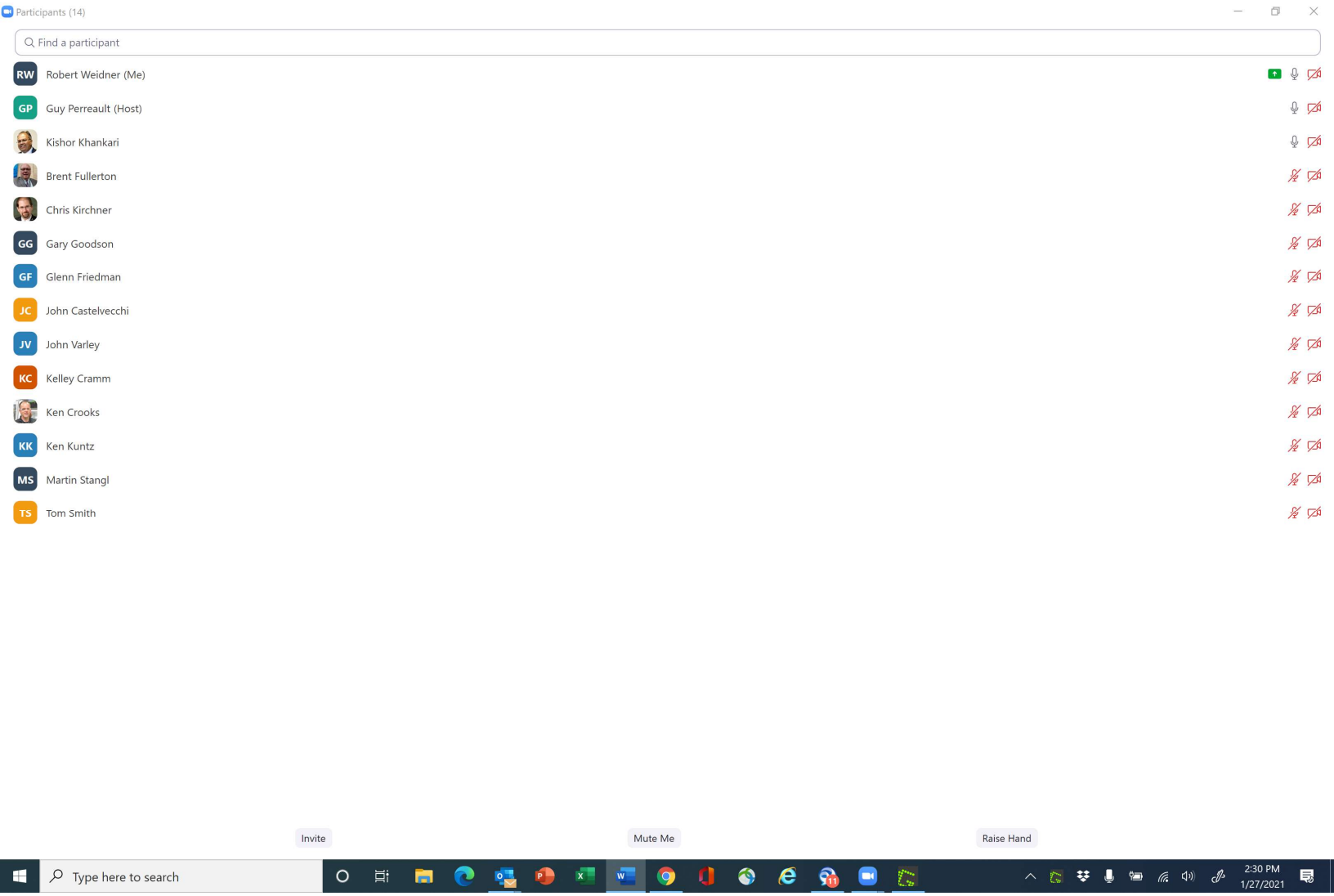
WS 1835 (Characterizing the Performance of Entrained Flow Stacks) – Brad C. (CPP)

1. On Hold - ASHRAE decided last fall not to bid any TRPs this fall. Another nine conditionally approved TRPs that may be ready in time to bid or re-bid this spring, but those projects bid in the spring would impact the SY 21-22 budget, which we anticipate might be even smaller than this SY budget due to the loss of the AHR Expo in Chicago. As a result, we plan to not release any additional projects for bid until possibly SY 21-22 or later.
2. Did receive a couple bids and unresponsive; more detail provided into work statement.

Research in progress, initiated or under consideration:

1. RTAR to "Survey of sources of contamination in existing labs" Roland C. and Tom Smith (on hold). No change but more info available.
2. RP 1833 on Air Change Rates: MTG committee encompassing several TC's looking into the why's and where's of Air Change Rates – Literature research on-going as first phase. *PI – AEI – Roger Lautz – (Clemson)*
3. 9.7 Higher Education – working on RTAR looking for TC9.10 to Co-sponsor specifically research for "Labs being used in higher education". *RHW to follow up with 9.7 on status. Kishor can help with the RTAR. Keith Hammelman.*

4. 1573 Follow-up Research Project to address additional scope not addressed in SF-6 Replacement Study (Bob Weidner and Tom Smith to develop RTAR post SF6 Research). *New generator required so waiting to see if RTAR is needed.*
5. 3D Printing, Laser Issues – emerging issues brief, parallel studies on-going at AIH. Kishor involved. 62, 9.10, Industrial Ventilation; Environmental Health. *No ownership of this to date; Would 9.7 be interested in taking on. Health consequences unknown. (nano particles and chemicals). Industrial Ventilation 30th Edition does not address 3D printing and laser printing. Elliott Horner – UL colleagues did presentations. There is a UL test standard, 2904, for assessing particle and chemical emissions. UL teamed with Georgia Inst. of Tech for a 2-year study.*
6. Demand Control Ventilation in labs to reduce air flow rates; how is this verified? Sensors installed improperly, never properly tested or maintained. *Tom Smith AHIA Z 9.5 will include modulation and response to occupancy with other sensing (CO2, particles, chemical, etc.) Test Methodology not available at this time. Mechanism of challenge. TC 9.11 has a RP on-going that may help. Sensor location is important based on room airflow conditions (or duct averaging). Ventilation effectiveness. Sensor response. Kishor, Bob to assist. Kishor to pull 9.11 WS*
7. *Ventilation effectiveness – I2SL research on-going; Potential collaboration; Multiple research projects needed. What is VE for Labs? Define VE and assessment. Kishor to initiate thought process. Bob, Tom;* ***Need volunteers – 5.3 Air Distribution; 9.7 Healthcare; Price Manufacturing representative; Guiding principles for good ventilation. Focus on labs.***
8. ***Using Analytics and to integrate to help better operate buildings. Need a lead!***


Participants (14)
Find a participant
Robert Weidner (Me)
Guy Perreault (Host)
Kishor Khankari
Brent Fullerton
Chris Kirchner
Gary Goodson
Glenn Friedman
John Castelvecchi
John Varley
Kelley Cramm
Ken Crooks
Ken Kuntz
Martin Stangl
Tom Smith
Invite
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1/27/2021

ASHRAE RP-1780 Contaminant transfer in energy wheels

PMS Meeting #5

January 19, 2021

Present: **PMS**: Robert Weidner, Roland Charneux, Nick Agopian, Brendon Burley
USASK: Carey Simonson, Jafar Soltan Mohammadzadeh, Mehrdad Torabi, Melanie Fauchoux, Hayden Reitenbach

Regrets: **PMS:** Hoy Bohanon

Personnel:

- **Dr. Srikrishna Mahadevan**, PhD (2015), Mechanical Engineering, University of Central Florida, accepted an offer to work on the ASHRAE project starting in November 2020. Unfortunately, Srikrishna has not received a visa to work in Canada. In January 2021, we reviewed other applicants for the position but did not find a suitable candidate that could begin work in January.
- **Decision:** If Srikrishna cannot join the research team by March 1, 2021, Easwaran Krishnan (a current USask PhD student) will take over and lead the experimental measurements.
- **Easwaran Krishnan** has nearly completed his PhD thesis. He has conducted his PhD research in the same USask laboratory as the ASHRAE project will take place. Easwaran's research is on small-scale testing of heat and moisture transfer in fixed-bed regenerators (see attached CV). Easwaran is familiar with developing and conducting experiments on heat and moisture exchangers but has not conducted contaminant measurements. He is well suited to lead the experimental measurements in the ASHRAE project.

Schedule

- February 1, 2021:
  - Second energy wheel ordered.
- March 1, 2021:
  - Laboratory research resumes.
- March 31, 2021:
  - Facility construction complete.
  - Literature review report ready for the PMS.
- April 15, 2021:
  - Preliminary test data shared with PMS.
- Late April
  - Next PMS meeting
- December 31, 2021:
  - We aim to have all tests completed in 2021 but may need to finalize some tests in 2022.
- March 1, 2022:
  - Proposed new end date for the project.
  - Final report submitted to ASHRAE.

ASHRAE TC 9.10
Lab Classification Subcommittee Meeting
Virtual Winter Conference
Wednesday, January 27th, 2021
2:40 – 3:40 p.m.

Minutes:

1. Introductions. Attendees:

Adam Bare	Ken Kuntz
Gaylon Richardson	John Castelvecchi
Guy Perreault	Robert Weidner
Brent Fullerton	John Varley
Chris Kirchner	Tom Smith
Gary Goodson	Kelly Cramm
Glenn Friedman	Kishor Khankari
Martin Stangl	

2. Recap of activities since the LVDL guide was published
    - Focused on getting the word out.
    - Various presentations / seminars.
    - The LVDL guide, meeting minutes, and meeting agendas have been posted to Basecamp.

3. Open discussion / feedback
    - The guide is being discussed fairly widely, but is not being widely used
    - Tom S reviewed some proposed updates that will eventually be needed to the LVDL guide. If nothing else, needs some minor formatting revisions.
    - Gaylon R suggested that the potential need for pressurization control and higher differential pressures be addressed in the LVDL guide
    - All agreed that the committee needs to start a campaign to get the word out about the LVDL guide, increase its use, provide training and explain its intended application, and receive feedback about how the guide could be improved.
        - Guy P suggested that we pursue using ASHRAE's Distinguished Lecturer Program to provide an avenue for getting the word out to ASHRAE

        - Kishor K suggested that we also consider asking the ASHRAE Publications Committee to include an article about the LVDL guide in the ASHRAE Newsletter, with a link to the guide
    - Adam B will be stepping down as chair of this subcommittee. Anyone interested in taking on this leadership role should contact Adam.

4. Next steps
    - Establish a campaign plan, and implement that plan, to get the word out.
    - Determine the schedule for near-term updates to the LVDL guide.

TC 9.10 Laboratory Systems
Design Guide Subcommittee Meeting, Wednesday January 27th, 3:45 – 5:15pm Eastern Time
Meeting Notes
Attendees:

Guy Perreault	Brent Fullerton	Carl Crow	Kishor Khankari	Kurt Rindoks
Tom Smith	Chris Kirchner	Gary Goodson	Gaylon Richardson	Glenn Friedman
John Castelvecchi	Martin Stangl	Mathew Warren	Robert Weidner	Kevin Gilkison
Brad Cochran	Jim Coogan	John Varley	Rachel Romero	Ken Crooks

-Review goal of sub-committee

Complete rev 3 of the Design Guide within 3- 5 years – Currently at 2+ years
Edit and revise a few chapters at a time until complete
Add content as necessary

-Reminder of Design Guide Process and Basecamp

- *Location: TC 9.10 basecamp, Docs & Files, Subcommittees, Design Guide*
- *Current unedited chapter versions are in "Version 2"*
  If you don't see it, it's being edited, look in version 3
- *Latest edited versions are in "Version 3"*
  Chapter leads will post current chapter edits (Version 3)
  Note color codes; Red-currently being edited (6 currently)
  Yellow – Edits complete and under review (1 currently)
  Green- Edits completed (3 currently)
  White – Not Started 10 currently
- *Deadlines – After the chapter lead has agreement from the team on edits, they will post the chapter in the Version 3 folder and "turn the color yellow for under review" and announce to the TC at the following meeting that it is ready for review. If no items are brought up by the meeting after that, the chapter will be completed and turned green.*
- *Chapter leads or SC chair will post the final chapter edits to the ASHRAE Authoring Portal*
- *SC chair will post Agenda and notes from meetings on Basecamp site*

-Review action items since last meeting

Chapter 3 Design Process:
No further edits-turned green

Chapter 5 laboratory hood design:
No further edits-turned green –Will be re-opened to include Exposure Control Devices

Chapter 11 controls:
No further edits-turned green –John C. and Jim C. have made recent updates by adding controls schematics

-Reminder to obtain permission or image utilization in guide –If you are adding new illustrations that are not from the author, please obtain proper permissions using the permission form at the back of the authoring guide. Contact SC chair with questions.

New Business – Chapter Report-Outs (5-10 min each)
Chapter Lead Report Outs / Group Discussion: (List of chapter leads & team at bottom of agenda)

-Chapter 4: Laboratory Planning, Jessica Mangler – no update
-Chapter 9: Exhaust Stack Design, Brad Cochran – will harmonize with Z9.5, I2SL and other publications
-Chapter 12 Airflow Patterns and Testing Procedures, Wei Sun –edits in basecamp for review
-Chapter 14: Laboratory Commissioning, Daniel Frasier –edit team complete, under review
-Chapter 16: Microbiological and Biomedical Laboratories, Daniel Frasier –edits in basecamp for review
-Chapter 17: CFD Modeling of Laboratory Ventilation, Kishor Khankari –being worked on
-Chapter 18: Sustainable Design, Rachel Romero – Roland and Rachel working on edits expect to have draft by mid spring.
-Chapter ~~19 (new)~~5: Exposure Control Devices, Tom Smith –Tom will put this information in chapter 5, may change title of chapter
-Chapter 20 (new): Ventilation Effectiveness, Kishor Khankari –Draft version in basecamp. Looking for additional input from members

-Additional chapters or Smart Guide content for editing?
Ideas for additional content (running list):
-O&M chapter harmonized with other ASHRAE publications
-How design guide applies to Z9.5 and where it applies –Jim C and Tom to review chapter to see where this fits (Chapter 9, …)
-Additional Chapter: Lab Classification-How to use, free download (smart guide) –Should be referenced in chapters 3 & 4 and placed in smart guide
-3D printing ventilation –The group felt that this is an ongoing research and that we do not have enough information to include it as a chapter at this time. Future revisions may include the topic.
-How to specify a lab: The group felt that this information should be incorporated into chapters 3 & 4 and does not warrant a chapter by itself.

-Additional topics for the design guide or comments?
-How to develop the basis of design (Gaylon)
-Air cleaners. This will be added to chapter 8. Bob Weidner to lead that chapter

Adjourn

Chapter Team List - Updated

Chapter	Title	Chapter Lead	Edit/Review Team
1	Introduction	Bob Weidner	
2	Background	Bob Weidner	
3	Design Process	Chris Kirchner	John Castelvecchi, Wade Conlan, Doug Ross
4	Laboratory Planning	Jessica Mangler	Brooks Stout, Harris Sheinman
5	Exhaust Hoods	Kurt Rindoks	Larry Meisenzhal, John Castelvecchi, Brooks Stout, Ken Kuntz, Tom

			Smith
6	Primary Air Systems		Bob Weidner, Brendon Burley, Charles Murphy, Wei Sun
7	Process Cooling		Brooks Stout, Charles Murphy
8	Air Treatment	Bob Weidner	Rami Alkahlil, Charles Murphy
9	Exhaust Stack Design	Brad Cochran	Ken Kuntz, Glenn Friedman, Martin Stangl
10	Energy Recovery		Bob Weidner, Brendon Burley, Chris Kirchner, Glenn Friedman, Charles Murphy
11	Controls	John Castelvecchi	Guy Perrault, John Garrett Neubauer, Brendon Burley, Brad Cochran, Doug Ross, Ken Kuntz, Jim Coogan, Wei Sun
12	Airflow Patterns and Testing Procedures	Wei Sun	Tom Smith, Salil Sansare, Dan Fraiser
13	O&M for Ventilation and Exhaust systems		Carol Donovan, Tom Smith, Harris Sheinman
14	Laboratory Commissioning Process	Daniel Frasier	Carol Donovan, John Garrett Neubauer, Tom Smith, Wade Conlan, Glenn Friedman, Harris Sheinman, Mike Amstadt
15	HVAC System economics		Rajendera Kapoor, Tao Zhang
16	Microbiological and Biomedical Laboratories	Daniel Frasier	Carol Donovan, Rami Alkahlil, Harris Sheinman, Wei Sun
17	CFD Modeling of Laboratory Ventilation	Kishor Khankari	Brad Cochran, Chris Kirchner
18	Sustainable Design	Rachel Romero	Brooks Stout, Chris Kirchner, Tao Zhang, Roland Charneux
SG	Smart Guide	Christine Reinders	

NEW	Lab Classification – How to use Guide (placed in smart guide)		Adam Bare
Add to 5	Exposure Control Devices	Tom Smith	Salil Sansare, Harris Sheinman
20-NEW	Ventilation Effectiveness	Kishor Khankari	Salil Sansare