

**Draft Minutes**  
**TC 2.3 - Gaseous Contaminants/Removal Equipment**  
**Research Subcommittee Meeting**  
**Kansas City, Sunday 5:00-7:00 pm**

1. Meeting call to order @ 5:05pm
2. Introductions and Sign-In
3. Review of Minutes from Atlanta  
No changes to the minutes.
4. RAC Report (Liaison TC 2.3 – Pawel W) – Pawel is outgoing liaison. Bill Hutzel will be our new one.
5. Active Projects – 40 min
  - A. **1720-TRP Validation of gas-phase air-cleaner performance test method (Standard 145.2) by laboratory testing of commercially available filtration devices** – PMS: Gemma Kerr, Paula Levasseur, Chris Muller, Nick Agopian, Marilyn Listvan. PI: Kathleen Owen
    1. **Kathleen Owen did an update on the project** – this is the second update for the PMS – and open group. This is an Inter Laboratory study (ILS) Performed to ASTM standard E691 and is not meant to evaluate the lab but the test method as written. The Labs are selected and a questionnaire has been sent out. Kathleen is working closely with the labs to ensure that they are running the test correctly. Two contaminants – 3 replicates – 5-6 labs (hopefully). Get with the PMS –regarding filters for the test.
    2. Get a room in Atlanta to review.
  - B. **1579-TRP Testing and Evaluation of Ozone Filters for Improving IAQ**— Sanjeev Hingorani, Kevin Kwong, Matt Middlebrooks, Nick Agopian, and Thad Ptak are on the PES. Awarded to U. Texas – Austin. Project start date 1/1/2019 Atila Novoselac PI; Jeff Siegel Consultant
    1. **Atila gave a report on the status of the project.** They have done a market study and have done work on testing and equipment. Studying both carbon and other technology. All tests will follow 145.2 test protocol with modifications. Test rig has been modified specifically for this project. Testing the impact of T and RH for technologies and not for filters. They are finding some unique results in aging, so are looking at the dynamics of the filter recovery.
    2. **Note after meeting** – Hans Besselman on the PMS is non-responsive. *He is our EHC rep. Sanjeev will try again to reach him. If he can't, Kathleen will approach EHC for a different person, then get 2.3 vote on change and process with ASHRAE.*
  - C. **1755-RP Impact of Gaseous Contamination and High Humidity on the Reliable Operation of Information Technology Equipment in Data Centers**". TC9.9 on-going project, TC 2.3 co-sponsor, Chris Muller on PES. Jensen is the PI. Provided the final report to the PMS.
6. Work statements and RTARs – Updates – 30 min
  - A. **1780-TRP, Test Method to Evaluate Cross-contamination of Gaseous Contaminant within Total Energy Recovery Devices**; Responsible Committee: TC 9.10 (Laboratory Systems); Co-Sponsors: TC 2.3. Nick Agopian on PES/PMS. They had to bid it again.
  - B. **1838-TRP Inclusion of Electronic Air Cleaners** in 145.2. – w/145 & 62.1 – Kevin Kwong. Chang-Seo Lee, Jeff Roseberry, Tony Abate, Nick Agopian, Ashish , Paula Levasseur. Proposals will be voted on at this meeting. PES is meeting on Monday.

- C. **1867-RTAR: Development and validation of a model for assessing the corrosion risk of Datacom equipment under different pollution and thermal environmental conditions.** TC 9.9 sponsor. 2.3 co-sponsored. Submitted to RAC by Dustin W Demetriou on 8/15/18. Jensen Zhang was lead RTAR author but will not be a WS writer. TC 2.3 needs a person on the WS writing group. RTAR was rejected. RAC couldn't see any difference between this and existing project (1755). Existing project must be completed first. On hold for next meeting. Find out who new Research Chair for 9.9 is and check with Chris Mueller.
- D. **1869-RTAR:** Evaluation of Indoor Air Contaminants with respect to Development of a Revised Indoor Air Quality Procedure (IAQP) Design Compound and Design Target Lists for Standard 62.1. Champion: Gemma Kerr. WG: James Dennison, Dean Tompkins, Marwa Zaatari, Hoy Bohanon, Wayne Thomann. Submitted 8/15/18, 11/8 accepted with comment to go on to WS. WS started. They have not gotten very far they are trying to fast track it.
- E. **1877-RTAR:** Outdoor ozone in naturally ventilated buildings. cosponsored from 62.1, Charlene on PMS. 2.3 is a cosponsor. 4.3 (Jordan Clark) submitted in Dec 2018 but RAC has not reviewed as of 6/4/19. This has been rejected by RAC, we must wait for the official response.
- F. **1846-RTAR:** Real Time Small sensors: Brian K., Fuoad Parvin, Thad Ptak, Jeff Roseberry, Sanjeev H., Jensen Zhang, Jordan Clark. No Update – waiting on the 2.4 sensor study
- G. **1858-RTAR:** sVOCs including how SVOC emissions change with temperature - Sanjeev\*, Jianshun Zhang, Kevin Kwong, Ying Xu 11/8/2018 Rejected by RAC. New version is still in the works. *Sent to Pawel for review Monday, returned with comments Monday night*

7. Proposed RTARS and other work: status updates - 25 min

- A. Bipolar Ionization/Reactive Air Cleaner performance test method for VOC etc. removal and testing a variety of commercially available ionization devices. Tony Abate champion, Scott Sherwood, Jensen, Dean Tompkins, Charlie Waddell, Chang-Seo, Marilyn Listvan, Ashish. Hold until we hear results of ISO/IEC.
- B. The effects of filtration on health. Dean Tompkins, Nick Agopian, Lexuan Zhong with EHC interest. Keep on the list Nick Agopian.
- C. Acceptable VOC types and concentrations for inclusion in multi contaminant test gases - on hold. Ashish to champion, Kathleen, Gemma, and Paula.
  - I. Ashish, Jensen, and Gemma wanted this idea left on the list – status is the same.
- D. The role of gas filtration improving IAQ in Residences – Jensen, Nick, Lexuan Zhong and Kathleen. Keep the topic and see if we can get someone to present a paper of case study. KJ Choi to try to set a program. Program presented at Kansas City.
- E. Demand-based air-cleaner operation to save energy. Brian Krafthefer, Jensen Zhang, Kyle Kisebach, someone from GPC 35 – Brian will work on this after the Sensor project (if).
- F. Venting for 3D Printers: needs champion (Paula, Gemma, Marwa, Dan, Kevin Marple with Brent talking to 2.4). needs champion. Note from Dan Mason: the UL report was published Nov 12, 2018. UL released the report in conjunction with Georgia Tech. – Kathleen Owen to resend email to Paula. *(at 2.3 Planning, Charlene said EHC wants to be involved in this Wayne Tominson (check spelling). Kevin Marple sent us a new name to replace him for 2.9: Joel Foster.*

G. Effect of particles on loading on gas filters, with possible interest in looking at other combinations of technologies in the same air cleaner (probably a separate project) 2.4 / 2.3/ 2.9 (Matt, Brian, Paula, VJ). Draft in progress: Sent to Pawel – hope to have TC vote at this meeting. *Pawel reviewed overnight. Kathleen sent to 2.4 and 35 for votes.*

8. New ideas: Jeff Siegal – interested in testing an air cleaner – using a chamber test. Gemma, Matt, Christine and Kathleen, Sanjeev, Paula.

9. Gas-phase dinner plans -

10. Adjourn Meeting

11. Notes from Research Chair Breakfast (takes place after the research meeting):

Project/WS/RTAR updates/checks - these files are often out of date, but we have to update the information and check on oddities.

- 1579 shows 3 missing quarterly project updates.
- 1720 shows 1 missing quarterly project updates. (KO knows she did send it in and has emailed Donna to make sure she got it.)
- 1838 on track, waiting for bid decision
- 1869 SUBMIT WORK STATEMENT FIRST DRAFT BEFORE AUGUST 15, 2020 OR TOPIC WILL BE REMOVED FROM DISPLAY ON PLAN. WS MUST BE SUBMITTED AND APPROVED FOR BID BY OCTOBER 1, 2022 OR TOPIC WILL BE DROPPED PERMANENTLY BY RAC. RAC ACCEPTED W/COMMENTS RTAR AT 2018 FALL MEETING.

There was a presentation on “ASHRAE Research Project Costs.” Points made included:

- TC cost estimates for research projects have a large effect on the bids eventually
- Bidders tend to adjust their interpretation of the work required to match the cost estimate – or not bid at all if they can't
- Cost estimation is a highly specialized profession – few TC members are cost estimators
- How are TCs developing estimates for ASHRAE research projects?
- Provide benchmarks to anchor estimates based on reality
- Total value of active ASHRAE Research Portfolio: \$11.2 million
- Paid to date: \$8.6 million
- Remaining to be paid: \$2.6 million
- Average of new research awards per year: \$1.5 million
- Average research project size is \$131,000
- Average project duration is 18 months
- Project costs: Mean is \$131,000. 95% of projects were in the range of \$48,000 to \$212,000
- Duration: Mean 18.1 months. 95% of projects were in the range of 6 to 30 months

In KC, RAC had:

7 Research Topic Acceptance Requests (RTAR): 1 Accepted, 2 Accepted with comments, 3 Rejected  
13 Work Statements: 1 Accepted, 5 Conditionally accepted, 7 Returned  
Wednesday - Contractor Selections for 6 Projects (27 bids)

Reminders about **Innovative Research Grant**

To establish seed funding for novel research that does not fit within the TC structure

- Out of the box research to complement that by the TCs

Competitive 2-stage review process for \$125k grant

- \$50k per year for 2 years, \$25k matching funds for year 3
- 15 pre-proposals reviewed in Atlanta, invited 4 full proposals
- Will determine on Wednesday, will announce in Orlando

In addition to the usual suggestion to nominate for Homer Addams award and to get students to apply for the Grant in Aid program, we were asked to consider submitting applications for the Service to ASHRAE Research Award. Since the requirements are a bit odd and need to be across TCs (work for more than one), I've listed the requirements. If anyone thinks they are eligible, let me know. I will work on getting a nomination application put together.

Eligibility Points for Service to ASHRAE Research Award:

- Work Statement (WS) Author
- Project Evaluation Subcommittee Service (Member or Chair)
- Project Monitoring Subcommittee Service (Member or Chair)
- Research Subcommittee Chair Service
- Research Advisory Panel Service (Member or Chair)
- Research Administration Committee Service (Member, Subcommittee Chair, or Chair)

Otherwise, ASHRAE has a tight budget right now, but we should keep submitting RTARs and WS for consideration and funding as it is available.

Attendees:

Paula Levasseur	LMF Services LLC	Henry Greist	Lennox
Brian Krafthefer	BCK	Mengjia Tang	UT Austin
Kyong Ju Choi	Clean & Science	Victoria Binz	Dynamic AQS NJ
Kevin Kwong	LMS Technology	Caitlin Naske	Dynamic AQS VA
Peter Freeman	Jacobi Carbons	Mick Flom	3M
Scot Sherwood	Eco Care Corp	Marilyn Listvan	Listvan Consulting
Matt Middlebrooks	Filtration Group	Chrystal Jolliffe	Columbus Ind
Sanjeev Hingorani	Lennox	Sissi Liu	Metal Mark
Nick Agopian	Renwaire	Rahul Bharadwaj	Lydall
Charlene Bayer	Hygieia Sciences	Saravanan Andan	Berry Global
Gemma Kerr		T Ptak	A O Smith
Dan Mason	Bioclimatex	Kia Ksanjaz	LMS Technology
Jeffrey Roseberry	Promark Associates	Dan Haas	Parker Hannifin
Christine Sun	Filtration Tech Intl	Atila Novoselac	UT Austin
Jeffrey Siegal	U Toronto	Avdi Maftakhari	UT Austin
Kathleen Owen	Owen Air Filtration Cons.		