



**DRAFT Meeting Minutes - ASHRAE MEETING – Summer 2023**  
**TC 2.3 - Gaseous Air Contaminants/Removal Equipment**  
**TC Meeting**

Time: 1:00 PM – 3:30 PM EST

Date: Tuesday, June 27

Location: Tampa Marriott Waterside, Grand Salon AB (2)

Link: <https://events.rdmobile.com/Sessions/Details/1780419>

Basecamp: <https://www.ashrae.org/technical-resources/technical-committees/tc-training-and-presentations>

TC 2.3 website link: <https://tc0203.ashraetcs.org/>

1. Call to order – Meeting called to order 1:01 PM EDT.

Name	Present?
Kyung-Ju Choi, PhD	YES
Matt Middlebrooks	YES
Michael Curtis Flom	YES
Vivekanand Gaur	YES
Ashish Mathur	ABSENT
Jianshun S Zhang, PhD	YES
Robert B Burkhead	ABSENT
Michael D Corbat	YES
David A Schaaf, Jr	ABSENT
Marwa Zaatari	YES
Victoria Leigh Binz	YES
Henry Greist	YES
Chrystal Jolliffe	YES
Kathleen Owen	YES
Scott Parris	YES

12 of 15 Voting Members present, QUORUM.

2. ASHRAE Code of Ethics

The ASHRAE Code of Ethics is to be adhered to by those doing ASHRAE business whether or not they are an ASHRAE member. The Code of Ethics can be reviewed at the below link.

<https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>

- **Code of Ethics Commitment**

In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness, and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism, and diversity, and we shall avoid all real or perceived conflicts of interests.

- **Diversity Commitment**



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ASHRAE is committed to providing a welcoming environment. Our culture is one of inclusiveness, acknowledging the inherent value and dignity of each individual. We proactively pursue and celebrate diverse and inclusive communities understanding that doing so fuels better, more creative, and more thoughtful ideas, solutions, and strategies for the Society and for the communities our Society serves. We respect and welcome all people regardless of age, gender, ethnicity, physical appearance, thought styles, religion, nationality, socio-economic status, belief systems, sexual orientation, or education.

3. Ask virtual members and guests to use the chat feature to enter their Name, Affiliation, Email Address, and YEA designation (if applicable) and international status (outside of US and Canada?) for meeting attendance records. Establish Quorum.

ASHRAE has an International Standards Interaction Task Force to increase ASHRAE outreach to international standards organization. International members of FGs could help support this outreach.

4. Chair's Report

Update from TC breakfast training

- Decarbonization
- ASHRAE global affairs efforts
- Subcommittee chairs please indicate if they attended training.

5. John Cohen report

Not present.

6. Review and Approval of previous meeting minutes

TC 2.3 website link: <https://tc0203.ashraetcs.org/>

No revisions to TC 2.3 Winter 2023 Atlanta draft meeting minutes. Kathleen makes the motion to approve TC 2.3 Main Meeting Minutes from ASHRAE 2023 winter meeting in Atlanta, Jianshun seconds the motion. 11-0-0-3-CNV; **PASSED**.

7. Items to be Voted on.

- TC2.3 Co-sponsor WS-1928 “Improving efficiency test methods to measure air cleaner performance against airborne particulate contaminants in a recirculating system.”
  - WS was revised to use particulates as the challenge contaminant. Approved by RAC Winter 2023 Meeting, need TCs to revoke to co-sponsor revised WS.
  - Henry makes the motion for TC 2.3 to co-sponsor revised WS-1928, Jianshun seconds the motion.
  - 11-0-0-3-CNV (favor-against-abstaining-not present-CNV); **PASSED**
- TC2.3 approval of 1720-RP “Validation of gas-phase air-cleaner performance test method (Standard 145.2) by laboratory testing of commercially available filtration devices” final report
  - Marwa makes the motion to approve the 1720-RP final report, Tori seconds the motion.
  - 10-0-1-3-CNV; Kathleen Owen abstains, PI on RP; **PASSED**
- TC2.3 approval of PMS selected contractor for 1869-TRP “Evaluation of VOCs with Respect to Development of Revised Standard 62.1 Indoor Air Quality Procedure (IAQP) Design Compounds and Design Limits”
  - Executive meeting for vote, all non-voting members asked to leave the room
  - Jianshun makes the motion for TC 2.3 to accept the PMS contractor choice for 1869-TRP, Marwa seconds the motion.
  - 11-0-0-3-CNV; **PASSED**



8. Get an update on:

- RP-1579 review as part of 62.1 to see recommendations to change the Standard.
  - Chris M. is submitting a change proposal to 62.2 to require air cleaning in any outdoor area that does not meet national standards for ozone. Will sync up with Standard 189.
  - Not yet completed, waiting on language. Goal to avoid conflict between standards.
  
- Summary of Existing and Proposed Test Methods

Title	Surface or Air	Target Pollutant	Test setup	Single pass versus multiple pass	Technology	Status
145.2	Air	Gases	Duct	Single pass	Sorbent-Being updated to apply to EACs.	Established Standard
AHAM AC-5	Air	bioaerosols	Chamber	draw down	electric room air cleaners	Published
AHAM AC-4	Air	Gases (toluene, limonene, heptane, ammonia, formaldehyde)	Chamber			
185.3	Air	Microorganisms	Chamber	draw down	Commercial In-room devices	
145.4	Air	Gases + byproducts	Chamber+ Duct	recirculation	All air cleaners- in duct and in room	
185.5	Air	particles and bioaerosols/ microorganisms	Chamber+ Duct	recirculation	All air cleaners- in duct and in room	
Proposed Research Project						
WS-1928	Air	bioaerosols/ microorganisms	Chamber+ Duct	recirculation	All air cleaners- in room only	Voting Complete

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## 9. Subcommittee Reports

- Research - Subcommittee Chair – Paula Levasseur (attended training)
  - Research breakfast training
    - RAC increased funding from 250K to 350K
  - Christopher Gray new liaison
    - Must submit RTARs through Christopher Gray, cc Paula on submission.
  - Push for PTARs (Publication Topic Acceptance Request), currently not many committees are taking advantage of PTARs.
  - Received a PowerPoint presentation during the research subcommittee meeting for a new potential RTAR, Paula will circulate to the research subcommittee.
  - WS prepared by TC 9.9 on data centers was rejected then resubmitted. TC 9.9 is requesting renewed confirmation of TC 2.3 co-sponsorship.
    - TC2.3 needs a copy of the revised work statement to be distributed to the group for review.
  - TRP-1780 “Test method to evaluate cross-contamination of gaseous contaminant within total energy recovery wheels.”
    - (Nick A.) Research is now complete, PMS voted to approve. Nick will report more at the next meeting.
    - Recommends that the PI give a presentation at the TC 2.3 Research Subcommittee in Chicago
  
- Handbook - Subcommittee Chair -- Brian Krafthefer/Michael Sherber; (attended training)
  - Michael S. new Chair, Caitlin N. new vice chair
  - Held a virtual meeting on June 13<sup>th</sup>, 2023. Next meeting will be at the end of August then monthly. Doodle poll will be sent to the group.
  - Chapter 27 is complete, subcommittee is working on Chapter 11 of the Fundamentals Handbook
  
- Membership - Subcommittee Chair -- Matt Middlebrooks (no training)
  - Strong committee membership
    - (2) Voting members rolling off after June 30<sup>th</sup>: Matt and KJ
    - Rotating on (3) members after June 30<sup>th</sup>: Kevin (chair), Paula, and Mengjia
  - 160 corresponding members, 5 TC new applicants since January, 34 YEA members, and 39 International members on the roster
  - A few corrections need to be made roster, ASHRAE has been notified.
  
- Planning - Subcommittee Chair – Kevin Kwong
  - Reviewed 2 presentations, past seminar will be posted to the website.
  - Continued conversation about TC 2.3 children’s book
  - TC2.3 membership and leadership
  
- Program - Subcommittee Chair -- KJ Choi
  - Seminar on “Emerging Gas-phase Technologies -- What You Need to Know” chaired by K-J during Tampa meeting
  - 1 seminar on the impact of gas stoves will be submitted for Chicago.
  - Other ideas discussed for “beyond Chicago” meetings.
  
- Standards - Subcommittee Chair – Michael Sherber
  - GPC 27, submission not completed in time to be voted on by the SPLS for approval in Tampa. SPLS will vote on it in a later meeting in the summer or fall.

### 10. Other Updates

- ASHRAE Learning Institute – Marilyn Listvan
  - Open to proposals for courses
  
- Publications - Subcommittee Chair -- Marilyn Listvan
  - Facebook group is set up and active, send Marilyn content for posting
- Website - Subcommittee Chair -- Caitlin Naske
  - The website is up to date.
  
- SSPC145 – Committee Chair – Tony Abate
  - 7 new members joining the roster.
  - 145.1 was revised and published.
  - 145.2 was revised and had 53 comments. The committee is almost finished responding to the commenters and revisions will be made based on responses to the comments.
  - 145.4 committee working to develop a new standard. The group meets monthly and has 4 working groups. Goal to have a rough draft of the standard completed by the winter 2024 meeting in Chicago.

### 11. Review of Action Items from Last Meeting

#	Action Item	Owner	Meeting Initiated	Update	Status
1	Workshop on performance rating system summary to be sent out.	Ashish Mathur	Atlanta	Complete – Remove from list for Chicago	Complete
2	Collection of TC member bibliography papers for website posting	Marilyn Listvan	Atlanta	No update given.	In progress
3	Development of a course on gas phase filtration to be part of ASHRAE supported classes and send to chapters	Paula Levasseur	Atlanta	<p>A basic slide deck was sent to Marilyn and Kevin. This deck has already been approved by ASHRAE.</p> <p>A longer 40-60 slide comprehensive gas phase presentation will need to be approved by ASHRAE once complete.</p> <p>Marilyn will post “History of Filters” presentation.</p>	In progress

#	Action Item	Owner	Meeting Initiated	Update	Status
4	Title/purpose /Scope for MTG or GPC on how to implement combined filtration systems	Brian Krafthefer	Houston	<p>“Implementing a Combined Filtration System Consisting of Gas and Particle Filters”</p> <p>The revised GPC TPS was emailed to TC 2.3 with the meeting agenda prior to the Tampa meeting for review. (Paula) Thought the scope would not be limited to particulates and gas phase contaminants but would be left open to include UV or others. Brian will send to Paula to edit to include language for the inclusion of more technologies in the combined system.</p>	In progress
6	ASHRAE Certification Program	Marilyn Listvan		<p>No update. The program is not doing well, less than 1000 certified members.</p> <p>Consider dropping item from the list at the Chicago 2024 meeting.</p>	In progress

## 12. Report from TC liaisons

### Henry Greist– TC 2.9 Ultraviolet Air and Surface Treatment

- Ongoing RP-1854, should have an update by the winter meeting in Chicago. Other research items: revised WS 1928 was voted on by co-sponsored committees during or prior to Tampa meeting, WS 1873 “Upper-Air Ultraviolet Germicidal Irradiation (UVGI) for Tall Spaces.”
- GPC 37 Upper Room UVC
- Standard 185, 185.5 TG4RAST “Method of Testing HVAC duct mounted devices and systems and in-room devices for particle and microorganism removal or inactivation in a chamber with a recirculating duct system”
- Discussion on approved 241 standard.

### Nick Agopian – 62.2 Ventilation and Acceptable Indoor Air Quality in Residential Buildings

- IAQ discussion. Focus on three main contaminants PM2.5, formaldehyde and NO2 looking to increase filtration to MERV 11 or MERV 13. Reduction of OA in a modified 62.2.
- 18 states have adopted 62.2.
- No further discussion on unvented combustion devices.

### Kathleen Owen - TG2.RAST (Michael Sherber) Reactive Air and Surface Treatment

- 185.5 discussion, goal to have a draft ready for review by the Chicago 2024 winter meeting.
- (Tony) TG2.IAQMD – indoor air quality monitoring devices

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- Purpose, to look at air quality monitors and determine performance guidelines for selecting and recommending monitoring devices and systems. Address any other gaps. TG was approved in Atlanta, reach out to Tony if interested.

#### Nick Agopian – TC 5.5 Air-to-Air Energy Recovery

- 1780-TRP “Test method to evaluate cross-contamination of gaseous contaminant within total energy recovery wheels” approved.
- Summary video is available to share with TC only, not to be made publicly available until research is posted by ASHRAE.

#### Nick Agopian – TRG-IAQP

- Interim meeting, presentation covering IAQP projects from start to finish. Let Tori B. know if you are interested in attending.
- 62.1 IAQP calculator

#### Marwa Zaatari - 62.1 Ventilation and Acceptable Indoor Air Quality

- Filtration/cleaning/other of OA in non-attainment areas
- IAQP discussions: DCs (previously COCs) how should they be measured and target levels provisions on air cleaning and efficiency, IAQP calculator and user’s manual was voted to go out for public review will be available sometime in July.
- Ongoing CMP updates and discussions

#### Jensen Zhang (Marwa) – EHC

- Voted to approve document covering trends in health and identify possible gaps.
- Marwa is new EHC Vice-chair following Tampa meeting.

#### Brian Krafthefer – TC 4.10 Indoor Environmental Modeling

- Added 2.3 and 2.4 to some of the seminars they are putting together.
- TC4.10 is developing an RTAR on diffuser flow. This will involve benchmark cases for CFD.
- Discussions on what can be done for decarbonization.

#### Tony Abate – TC 4.3 Ventilation Requirements and Infiltration

- Conflict with TRG4, Tony voting member on both committees
- Working to put together member background document for members to reference.
- Meeting on September 4<sup>th</sup>
- 4 proposed seminars; parking garage emissions rates due to the increased prominence of electric cars

#### John Rajala – TC 2.4 Particulate Air Contaminants and Particulate Contaminant Removal Equipment

- Will be meeting directly after this meeting.
- 52.2; decrease in charge of electrostatic filters, Standard 241 and impact on existing standards

#### Kevin Kwong – U.S. TAG to ISO/TC 142, AHAM (AC-4, gaseous CADR chamber test) and IEC (CADR-like chamber test for gaseous pollutants)

- Working group 4- gas phase; perceived odor test with some measurement, not completely subjective
- Working group 11- in room air cleaner; document in process, uncertain of status of completion
- AC-4 has been published, can be removed from the list for updates.



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- ASTM byproducts standard, representative of actual chemistry of air test

Paula Levasseur – TC 9.1 Large Building Air-Conditioning Systems

- Meeting conflicts with TC 2.3 meeting
- Remove from the list for updates.

Brian Krafthefer – TC 2.1 Physiology and Human Environment

- No update, time conflicts with other meetings
- Add committee titles to the agenda.

Matt Middlebrooks—TC 2.2 Plant and Animal Environment

- Covers environments such as cannabis which contain odors/gas phase contaminants.
- Most discussion currently on viral transfer and particulates

Marilyn- 9.7 Educational Facilities

- No update

**13. New Business**

- (Matt M.) TG9.SPACE Extraterrestrial and Deep Space Environmental Control
  - Looking to transition into a TC
  - Discussing/investigating current ASHRAE standards and how they could be adapted to fit these special spaces such as space stations, vehicles, etc.
- (Paolo Tronville)
  - “Ventilation for Buildings- Environmental product declarations-Product Category rules complementary to EN 15804 for ventilation components”
    - Manufactures will need to declare CO2 emissions rate to the whole life of a product including materials, operation, and disposal; decarbonization.
  - TC 2.4 near completion on a project for developing a new procedure for aging filters, completion is expected in August. Studies the behavior of particle loading and the impact on filters.
- (Jianshun Z)
  - International energy agency new project, metal organic frameworks, moisture, and VOCs.
    - Investigating new materials and new applications for VOC adsorption
    - Group actively recruiting, group currently is represented by 18 researchers from 11 countries.
    - Will send more information to Tori and Kevin to distribute to the group.
    - Will be a 5-year project.

**14. Adjourn**

Meeting adjourned