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**Draft Meeting Minutes - ASHRAE MEETING – Summer 2022**  
**TC 2.3 - Gaseous Air Contaminants/Removal Equipment**  
**TC Meeting**

6/28/2022

1:00:00 PM– 3:30:00 PM Eastern Time (ET)

**Meeting Link:** <https://ashrae.webex.com/ashrae/j.php?MTID=m43400a401c67f10bf53d0eb717f54e5f>

**Access Info:** Meeting number: 2343 089 7505 Password: TC2.3 Join by phone 18662994153 United States of America Toll Free +14702385742 US Toll Access code: 2343 089 7505

1. Call to order

Meeting called to order 1:03 PM EDT

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**

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) for meeting attendance records. Establish Quorum.

Established Quorum. Present 10/14

Name	Present?
Tony Abate	Yes
Dr Carolyn M Kerr, PhD	Yes
Mr Jeffrey Roseberry	No
Dr Christine Q Sun	No
Dr. Kyung-Ju Choi, PhD	Yes
Mr Matt Middlebrooks	Yes
Mr Michael Curtis Flom	Yes
Vivekanand Gaur	Yes
Mr Ashish Mathur	Yes
Dr Jianshun S Zhang, PhD	No
Mr Robert B Burkhead	Yes
Mr Michael D Corbat	No
Mr David A Schaaf, Jr	Yes
Marwa Zaatari	Yes

#### 4. Chair's Report

##### 1. Update from TC breakfast training

- **MOP July 2022 update** Functional Group (FG) MANUAL OF PROCEDURES (MOP) for ASHRAE Technical Committees (TCs), Task Groups (TGs), and Technical Resource Groups (TRGs). Available at [www.ashrae.org/TAC](http://www.ashrae.org/TAC)
  - FG MOP Separate from MTG MOP
  - Requires balance for voting membership and known financial interests
  - Requires that the Chair, Vice-Chair, and all voting members are also members of ASHRAE
  - Recommendation to conduct virtual meetings between the Annual and Winter meetings
    - Will need to document and give 2 weeks notice to ASHRAE about these meetings
  - Discuss and confirm that TCs, TGs, TRGs, and MTGs in section will continue in 23-24 Society Year

##### 1.7. Review

1.7.1. Once a year, preferably at, or prior to, each Winter Society meeting, the FG Chair and Membership shall evaluate their progress in accomplishing the purpose for which they were constituted and recommend one of the following actions to their Section Head:

- a) Continue as a FG
- b) Merge with a FG and submit a revised scope for the merged FG
- c) Dissolve the FG.
- d) If an FG votes to disband, it must establish whether any current responsibilities should be continued and, if so, recommend existing FG(s) to assume the responsibilities and obtain those FG written concurrence.

- Technical Activities Committee (TAC) open mic policy to allow the ASHRAE membership to voice their concerns and offer improvements. They meet on Saturday and Wednesday of each conference. You can e-mail [asktac@ashrae.net](mailto:asktac@ashrae.net) for more details.

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- New form to submit motion to TAC for consideration. Intent to give FGs a method to require TAC response, report ideas, etc. will be added to the website and basecamp.

#### **Interim TC Meeting Procedures:**

- Maintain a listing of the interim meetings on the Technical Committees webpage ([www.ashrae.org/technical-resources/technical-committees](http://www.ashrae.org/technical-resources/technical-committees)), like the listing done for Standards.
- TC interim meetings should be posted (by emailing [shammerling@ashrae.org](mailto:shammerling@ashrae.org)) two weeks or more before an online meeting and four weeks before a face-to-face meeting. The person emailing should also include the meeting call-in info/ link for posting.
- To keep our members apprised of the meetings, we will add a notice in the ASHRAE Journal Newsletter (bimonthly) to remind our members to check the listing and to provide a link to the list.

#### **ASHRAE Certification Committee seeking ideas from TCs for possible professional certification programs**

- Certification Committee seeking ideas from TCs for possible professional certification programs related to 1) support adaptability, resilience and recovery of buildings and communities, **2) promote understanding of indoor environmental quality (IEQ) among practitioners**. Representatives from the Certification Committee will meet with TCs in Orlando that expressed an interest or had ideas.

#### **AWARDS (Due date – September 1)**

- i. ASHRAE GEORGE B. HIGHTOWER TECHNICAL ACHIEVEMENT AWARD
- ii. SERVICE TO ASHRAE RESEARCH AWARD

#### **ASHRAE is meeting next in Atlanta, GA, USA, Feb 4-8, 2023. Seminar and Forum proposals are due by Tuesday, August 9, 2022.**

- Please visit the following site to submit your proposal [www.ashrae.org/conferences/2023-winter-conference-atlanta](http://www.ashrae.org/conferences/2023-winter-conference-atlanta).

#### **Updated TAC Presentation Template Available for TC members to use with local Chapter**

TAC recently updated the standard presentation and presentation notes that TC members can use, without a lot of effort, to explain what TCs do for the Society and how that work benefits members in your local ASHRAE Chapter.

The new presentation and presentation notes files are posted now at the following link [www.ashrae.org/tcs](http://www.ashrae.org/tcs) under the heading General TC Information at the top of the page in case you prefer to direct others to these files posted online. The presentation material is now also available in both English and Spanish.

#### **Basecamp:**

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

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

5. Reporting from ASHRAE liaisons.

John Cohen Section 2 report:

- i. No new updates following the Chair's Breakfast on Sunday 6/26.
- ii. Chairs breakfast workshop recording and other information can be found at the following link:  
<https://www.ashrae.org/communities/committees/standing-committees/technical-activities-committee>

6. Review and Approval of previous meeting minutes: **TC 2.3 website link:** <https://tc0203.ashraetcs.org/>

EDIT: Michael Sherber, update from virtual to in-person

7. Items to be Voted on:

- i. RTAR: "The Effects of Filtration and Air Cleaning on Health & Safety" (Distributed by Marwa Z on June 13, 2022).
  - Sent to TC2.4, Brent S. sent back commented. Suggested the inclusion of some further references. Put on hold until edits have been made by Caitlin, will send out after edits are made and will do an **online vote**.
    - Discussion on DALYs. Look at contaminants of concern and how they impact health. Proposed research literature review on gas phase contaminants and apply the DALY model to include them.
      - PM 2.5, coarse particles, and formaldehyde are the top DALYs
- ii. Chapter 47 revision 'K' of the chapter 47 in the HVAC Applications Volume (distributed by Brian K on June 4, 2022)

Name	Vote Status
Tony Abate	Yes
Dr Carolyn M Kerr, PhD	Yes
Mr Jeffrey Roseberry	Absent
Dr Christine Q Sun	Absent
Dr. Kyung-Ju Choi, PhD	Yes
Mr Matt Middlebrooks	Yes
Mr Michael Curtis Flom	Yes
Vivekanand Gaur	Yes
Mr Ashish Mathur	Yes
Dr Jianshun S Zhang, PhD	Yes
Mr Robert B Burkhead	Yes
Mr Michael D Corbat	Absent
Mr David A Schaaf, Jr	Yes
Marwa Zaatari	CNV

8. Get an update on:

- i. Matt Middlebrooks (WS-Lead Author) commented that WS 1928 was accepted with comments August 2021. WS was revised and sent to TC 2.3 Voting Members January 2022.
  - Was revised, with TC2.9 (primarily pathogens) help. Co-sponsors were added; TC2.3, 2.4, 9.6 and EHC and was submitted by the May 15<sup>th</sup> deadline. Did not receive a formal response, informally told that it will be sent back with comments.

- Matt M. is stepping back, and Chrystal J. will be taking the lead on the WS moving forward.
- Next deadline is August 15<sup>th</sup>
- Nick A: Attended MTC.VIC, ventilation for infection control. MTG discussed the challenges and difficulty associated with collecting these viruses for testing. Nick to share contact with the committee.

#	Motion	Vote (For-Against-Abstain-Absent-Chair Voting Status)
1	New Standard Proposal: Method of Test for Assessing the Gas-Phase Performance of Air Cleaning Devices and Systems in a Duct-Chamber Apparatus.	(12-0-0-1-1)
2	WS 1928: Improving biological efficacy test methods to measure in-room air cleaner performance against airborne pathogens (see table below)	(13-0-0-0-1)

**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
185.3	Air	Microorganisms	Chamber	draw down	Commercial In-room devices	Standard being written
"145.3" TPS	Air	Gases + byproducts	Chamber+ Duct	recirculation	All air cleaners- in duct and in room	TPS written
RAST TPS	Air	particles and bioaerosols/ microorganisms	Chamber+ Duct	recirculation	All air cleaners- in duct and in room	TPS being written

Proposed Research Project



WS-1928	Air	bioaerosols/ microorganisms	Chamber+ Duct	recirculation	All air cleaners- in room only	New votes in progress, (cleared TC2.9 ?)
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## 9. Subcommittee Reports

### 1. Research - Subcommittee Chair – Paula Levasseur

- i. Vice Chair, Caitlin N., attended the breakfast training meeting. ASHRAE sent out 8 research projects for bid. ASHRAE is working on a web based RTAR/WS submittal process.
- ii. 28 Attendees attended the research subcommittee meeting, and the Las Vegas winter research subcommittee meeting minutes were finalized and approved.
- iii. Current project updates:
  - 1579, finalized and approved
  - 1720 (co-sponsor), granted a no cost extension
  - 1838, granted a no cost extension. Dean T. (PI) was not available to attend 1838 PMS meeting. A partial draft was sent to Kathleen, still waiting to receive a draft of the final report. PMS has not had the chance to review. Project needs to be completed by July 31<sup>st</sup>
  - 1780, PMS is pleased with the progress
- iv. RTARS and WS:
  - 1867-RTAR (co-sponsor), presentation occurred during the TC9.9 on Sunday June 26. The presentation should be made available to the committee, when it is it will be put onto basecamp.
  - 1869-WS, was submitted
  - 1858-RTAR, WS was re-written, comments were received but no further work has been completed. Gabrielle D. and Sanjeev will work on it before Atlanta meeting
  - 1895-WS, “Effect of particles on loading on gas filters”, still waiting for co-sponsor support. Will follow up with Brian to get an update
  - 1928-RTAR, WS was accepted with comments and more co-sponsors were added. Matt will hand the lead off to Chrystal J.
  - 1935-RTAR, Chang-Seo is the lead, RTAR submitted and conditionally approved but no further work has been done on writing the WS.
- v. Determine if subcommittees need to have a balanced membership, reach out to liaison.

### 2. Handbook - Subcommittee Chair -- Brian Krafthefer; Gemma reports out

- i. TC 2.3 is responsible for two chapters. Chapter 47 needs to be submitted to ASHRAE in a few weeks.
- ii. Revision K is the final version, a few minor changes will be made but they will not be substantive changes.
- iii. Gemma makes the motion that TC 2.3 recommend that Chapter 47 is ready to submit to ASHRAE. Results of the vote above (10-0-0-3-1) *For-Against-Abstain-Absent-Chair Voting Status*, vote passes.

### 3. Membership - Subcommittee Chair -- Matt Middlebrooks

- i. Strong committee membership. Currently 14 Voting Members, 2 Non-quorums, 4 will be rolling off (Tony, Gemma, Jeff, and Christine) and 5 will be rolling on (Tori, Henry, Chrystal, Scott P,

and Kathleen). Committee has 126 CM, 26 PCM, 24 YEA members and 8 new membership requests since the Las Vegas Winter meeting.

- ii. Matt shared screen and walked those on the call how to join the TC online.
4. **Planning - Subcommittee Chair – Kevin Kwong**
- i. Focus of the subcommittee meeting was brainstorming ideas for the TC 2.3 roadmap, Kevin posted current version of the roadmap to basecamp. Main take away is to have goals and milestones that can be reviewed and discussed each meeting.
  - ii. Group discussed ways that we can better market TC 2.3. Ideas included generating a brochure and distribute to different outlets such as NAFA.
5. **Program - Subcommittee Chair -- KJ Choi**
- i. TC 2.3 had 1 seminar involving COVID 19 and indoor air filtration
  - ii. TC 2.4 “Why you shouldn’t lick your filter” will be held tomorrow and all are encouraged to attend
  - iii. A new program is recommended, Annex 78 on the perceived air quality performance due to air cleaners. Concept of substituting OA based on gas phase CADR, new test methods to test gas phase air cleaners, energy performance of gas phase air cleaners vs OA, modeling of performance. [Proposal for Atlanta and TC 2.3 vote to sponsor.](#)

<b>Name</b>	<b>Vote Status</b>
Tony Abate	Yes
Dr Carolyn M Kerr, PhD	Yes
Mr Jeffrey Roseberry	Absent
Dr Christine Q Sun	Absent
Dr. Kyung-Ju Choi, PhD	Yes
Mr Matt Middlebrooks	Yes
Mr Michael Curtis Flom	Yes
Vivekanand Gaur	Yes
Mr Ashish Mathur	Yes
Dr Jianshun S Zhang, PhD	Yes
Mr Robert B Burkhead	Yes
Mr Michael D Corbat	Absent
Mr David A Schaaf, Jr	Yes
Marwa Zaatari	CNV

Vote passes (10-0-0-3-1), TC 2.3 will sponsor, Marwa will send information to K-J

6. **ASHRAE Learning Institute – Marilyn Listvan**  
No update.
7. **Publications - Subcommittee Chair -- Marilyn Listvan**
- i. Marilyn asks for anyone interested in writing an article to email her. EHC is looking for volunteers to write in their IEQ column in the ASHRAE journal and it would be great to have some out of TC 2.3.
  - ii. Urges members to read the article that Gemma and Kathleen wrote on 52.2



8. Standards - Subcommittee Chair – Michael Sherber
  - i. Standards subcommittee meeting minutes were sent out
  - ii. A vote was taken to update GPC27. Gemma will chair the update, other volunteers Brian, Chris V. and Marilyn
  - iii. 145.1 updates to definitions were approved for PPR and 145.2 updates are close to being submitted for PPR. 145.2 was approved for TPS by PPIS and is moving to look for approval from standards committee.
9. Website - Subcommittee Chair -- Caitlin Naske
  - i. ASHRAE changed website format. Some of the historic document links were lost in the update, will need to retrieve and re-upload these documents to the website.
10. SSPC145 – Committee Chair – Tony Abate
  - i. 145.1 submitted for PPR primarily definition updates, 145.2 changes in progress regarding incorporating updates from RP 1838 (inclusion of EACs), 145.3 PPIS voted on the TPS was approved and being moved to standards committee for a vote.

**10. 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	No update. Ashish worked on/held different forum last meeting.	
2	Collection of TC member bibliography papers for website posting	Marilyn Listvan	Atlanta		Ongoing
3	Development of a course on gas phase filtration to be part of ASHRAE supported classes and send to chapters	Paula Levasseur	Atlanta	No update. Paula does have presentations and will send to Gemma and Chris V. Needs to be reviewed by ASHRAE before it can go onto basecamp.	Ongoing
4	Title/purpose /Scope for MTG or GPC on how to implement combined filtration systems	Brian Krafthefer	Houston	Not present.	
6	ASHRAE Certification Program	Marilyn Listvan			

**11. Report from TC liaisons**

1. Henry Greist– TC 2.9
  - i. 185 TPS for revising the 185.3 language
  - ii. WS 1928 was passed
  - iii. Received a project bid on UV does (RP)
  - iv. 1873 is in the queue to be approved to go out to bid but is set to expire soon.
2. Nick Agopian – 62.2
  - i. Ongoing conversation regarding unvented combustion devices. Discussion about what the maximum level of NO2 should be, however committee feels that pollutants and limits beyond just NO2 should be addressed

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- ii. Working group for the development of a 62.2 IAQP. Committee is taking the DALY approach versus a threshold approach (62.1 IAQP).
    - iii. Emerging contaminants
    - iv. Update to MERV 11 being the minimum requirement, some push to be increase to a minimum of MERV 13 to be consistent with Title 24 in California
  3. Kathleen Owen - TG2.RAST
    - i. RAST- Reactive Air and Surface Treatment, scope safety and effectiveness of electronic air cleaners. TPS was approved by PPIS and will be reviewed by the standards committee for approval tomorrow
    - ii. Matt M, RAST focus on the technologies versus the contaminants.
  4. Nick Agopian – TC 5.5
    - i. TC focuses on air to air energy devices, related to TC 2.3 because of the research involving cross contamination within these devices (potentially gas phase). Hopes to have an update in Atlanta.
  5. Nick Agopian – TRG-IAQP
    - i. Discussion about what/who is TRG4. TRG4 falls under 62.1 research and initial conversation was that the TRG should develop into a TC. Charlie S. indicated that this may not be the right path that we should adjust what our goals are and what work should be conducted. VRP right now is what most engineers are comfortable with.
    - ii. VRP versus IAQP
  6. Marwa Zaatari - 62.1
    - i. Discussion if 62.1 needs to address airborne pathogens and if the standard should cover them. If they should be included the question arises about how they should be included.
    - ii. Subcommittee voted on an addendum that requires efficiency testing but would allow any method to be used if the value is reported
    - iii. Dew point versus relative humidity, want to change the standard back to requiring relative humidity versus dew point due to the availability of sensors/technology to report dew point
    - iv. Ozone generating devices
  7. Jensen Zhang – EHC
    - i. Presentation on the DALY approach, approach in determining harm. What will the role of filtration be?
      - Some concerns that acute exposure, secondary contaminants, and byproducts are not included, more research is needed
    - ii. IAQP as an alternative to the VRP. What Is the VRP accomplishing and what is the equivalent to IAQP
    - iii. Looking for volunteers to write articles for the IEQ section of the ASHRAE journal
  8. Brian Krafthefer – TC 4.10  
Brian not present to give an update.
  9. Tony Abate – TC 4.3
    - i. Megan M will be rolling on as new Chair
    - ii. RP 1835 characterization of induced flow fans currently waiting for ASHRAE funding
    - iii. RTAR for the development of a global IAQ database, TC 2.1 new co-sponsor
    - iv. New idea presented involving garage exhaust requirements due to electronic car charging stations



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- v. Has submitted ideas for programs and seminars to ASHRAE but has had issues getting them approved. May present them to the TC at no cost to participants instead of through ASHRAE funded program
- 10. John Rajala – TC 2.4
    - i. John Rajala volunteers to be new liaison moving forward.
  - 11. 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)
    - i. AC4 was published
    - ii. New sub working group was established to look at byproducts
    - iii. ISO/TC 142, working group 8 for gas phase devices and media 1012.1 in the final stages
    - iv. No update on IEC chamber test
  - 12. Paula Levasseur – TC 9.1  
No update given
  - 13. Brian Krafthefer – TC 2.1  
No update given
  - 14. Marilyn- 9.7
    - i. Educational facilities, interested in the 3D printer discussion. TC 2.3 has less interest, but we should still be involved. We should volunteer to help write the WS.
    - ii. Discussion in the meeting if hybrid meetings are working and if they want to continue holding them in the future.

## 12. New Business

## 13. Adjourn

Meeting adjourned at 3:24 EDT