



**Minutes - ASHRAE MEETING – Virtual, Winter 2021
TC 2.3 - Gaseous Air Contaminants/Removal Equipment
TC Meeting**

Friday (01/22/21), 1:00 pm - 4:00 pm
Zoom Meeting

Meeting membership attendee list is as follows:

Last Name	Name	Member Status	Position	Present
15 out of 17 Voting Members in attendance				
Abate	Mr. Anthony Abate	VM	Member	P
Bayer	Dr. Charlene W. Bayer, PhD	VM	Member	P
Choi	Dr. KJ Choi, PhD	VM	Program Chair	P
Flom	Mr. Mick Flom	VM	Member	P
Gaur	Dr. Vivekanand Gaur	VM	Member	-
Hingorani	Dr. Sanjeev Hingorani, PhD	VM	Chair	P
Kerr	Dr. Gemma Kerr, PhD	VM	Member	P
Krafthefer	Mr. Brian Krafthefer	VM	Handbook Chair	P
Kwong	Mr. Kevin Kwong	VM	Secretary	P
Lee	Dr. Chang-Seo Lee, PhD	VM-NQ	Member	P
Mason	Mr. Dan Mason	VM	Member	P
Mathur	Dr. Ashish Mathur	VM	Member	P
Middlebrooks	Mr. Matt Middlebrooks	VM	Membership Chair	P
Roseberry	Mr. Jeffrey Roseberry	VM	Member	P
Sun	Dr. Christine Sun, PhD	VM-NQ	Member	P
Tronville	Dr. Paolo M. Tronville, PhD	VM	Member	P
Zhang	Dr. Jensen Zhang, PhD	VM	Member	-

Summary of Motions

#	Motion	Vote (For-Against-Abstain-Absent-Chair Voting Status)
1	Motion to approve the TC 2.3 minutes from Summer 2020 1 st – Brian Krafthefer, 2 nd – Ashish Mathur	14-0-1-2-CNV

1. Meeting was called to order by Chair @ 1:00pm

- a. The Chair reviewed the ASHRAE Code of Ethics.
 - i. 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.
 - ii. <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>
 - iii. As members of ASHRAE or participants in ASHRAE activities we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct. We will avoid conflicts of interest, and behavior that is discriminatory and/or harassing.



- b. Members and guests were encouraged to use the Zoom chat feature to enter their Name, Affiliation, Email Address, and YEA designation (if applicable) for meeting attendance records.
 - c. It was determined that there was a Quorum with 15 of 17 voting members present at roll call.
 - i. Voting Members for this meeting: Charlene W Bayer, Sanjeev Hingorani, Brian Krafthefer, Kevin Kwong, Chang-Seo Lee V-NQ, Paolo Tronville, Tony Abate, Carolyn M Kerr, Jeffrey Roseberry, Christine Sun V-NQ, Kyung-Ju Choi, Daniel Mason, Matt Middlebrooks, Michael Flom, Vivekanand Gaur, Ashish Mathur, Jianshun Zhang.
 - ii. 17 Voting Members and 2 NQM
 - iii. > ½ Voting Members Present (9) (Yes – 15/17)
 - a. Absent: Vivekanand Gaur, Jianshun Zhang
 - d. Chair’s Report
 - i. Special Thanks to TC2.3 Leadership team (Brian, KJ, Kevin, Matt, Marwa, Marilyn, Michael, Paula, Tony) and all Members & Participants for making this a successful Virtual meeting.
 - ii. ASHRAE Summer Conference: Phoenix, AZ Jun 26–30, 2021: No decision has been made on it.
 - iii. Research Funding: Only supporting ongoing commitments, no new projects being awarded so far in 2020/21 society year. RAC accepting new projects (RTAR & WS), approved project not released for bidding.
 - iv. Training Material: <https://www.ashrae.org/technical-resources/technical-committees/tc-training-and-presentations>
 - e. Reporting from ASHRAE liaisons.
 - i. Jon Cohen (Section 2 Head)
 - 1. There were no updates on the Summer 2021 ASHRAE meeting plans. The current plan is to still meet in-person in Phoenix.
 - 2. Jon will forward to TAC Sanjeev’s request for virtual meetings as a supplement to in-person meetings.
- 2. Review and Approval of previous meeting minutes from Orlando.**
- a. Brian Krafthefer motioned to approve the TC 2.3 minutes from Summer 2020.
 - i. 2nd – Ashish Mathur
 - ii. 14-0-1-2-CNV (For-Against-Abstain-Absent-Chair Voting Status)
 - iii. Abstain: Sanjeev Hingorani (CNV)
 - iv. Absent: Vivekanand Gaur, Jianshun Zhang

3. Summary of votes between meetings:

- a. No votes between meetings

4. Review of Action Items from Last Meeting

#	Action Item	Owner	Meeting Initiated	Update from Winter 2021 (Virtual Meeting)	Status
1	Workshop on performance rating system summary to be sent out.	Ashish Mathur	Atlanta	Ashish submitted the workshop but did not receive any feedback. Ashish plans to submit again before Feb. 8 th deadline.	Open

#	Action Item	Owner	Meeting Initiated	Update from Winter 2021 (Virtual Meeting)	Status
2	Collection of TC member bibliography papers for website posting	Marilyn Listvan	Atlanta	Gemma forwarded a list of publications to Marilyn. Marilyn sent this to Paula for the website. Marilyn requests TC 2.3 members to send relevant articles to her. Marilyn will send to Sanjeev for posting on Basecamp.	Ongoing
3	Development of a course on gas phase filtration to be part of ASHRAE supported classes and send to chapters	Paula Levasseur	Atlanta	Paula, Matt, and Kathleen have presentations (narrated slides) for current ASHRAE conference. They will send their presentations to Sanjeev. Sanjeev will check with ASHRAE on usage.	In-Process
4	Title/purpose /Scope for MTG or GPC on how to implement combined filtration systems	Matt Middlebrooks Brian Krafthefer	Houston	Matt has taken no action and requested a volunteer to be the new lead. Brian volunteered to lead this effort with Matt's help.	Open
5	Twitter account	Marwa Zaatari Caitlin Naske	Long Beach	Caitlin volunteered to take over the Twitter account. Caitlin, Marwa, Marilyn, Bill, and Nick will have a meeting to discuss topics and frequency of posts on Twitter and LinkedIn.	Ongoing
6	ASHRAE Certification Program	Christine Sun	Orlando	No updates on a training program. Christine sent an email to ASHRAE but has not yet received a response.	Ongoing

5. Subcommittee Reports

- a. Handbook - Subcommittee Chair -- Brian Krafthefer
 - i. Chapter 11 "Air Contaminants" in ASHRAE Fundamentals.
 1. Michael will lead revisions on this Chapter with help from Brian and Gemma.
 2. Current revision has been sent to ASHRAE but galley's have not been received.
 3. Next revisions to this Chapter are due in 2024.
 - ii. Chapter 47 "Air Cleaners for Gaseous Contaminants" of ASHRAE HVAC Applications.
 1. Michael will lead the next revisions to Chapter 47 with help from Brian.
 2. The current Chapter revisions must be submitted by July 22.
 3. Comments were received on some equations.
 - a. Paolo volunteered to help review equations. Paolo also suggested adding derivations.
 - b. Gemma believes that Brian may have some derivations from past discussions.
 - c. Brian will add the topic of derivations to the next teleconference.
 4. Brian will look at the published version of 145.2 to see if any equations should be added into Chapter 47. The consensus in the subcommittee was any new equations stemming from the 145.2 rewrite should not go into the current Chapter 47 revision.
 5. Permissions for tables and graphs will be reviewed.



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6. Review of references will be led by Chang-Seo with help from Caitlin and Brian.
 - iii. Teleconferences will be held on the 2nd week of March and 3rd week of May. Brian will send out a reminder on the 2nd week of February after the ASHRAE conference is over.
- b. Membership - Subcommittee Chair -- Matt Middlebrooks
 - i. Currently 17 Voting Members.
 1. Six Voting Members rolling off in the summer: Charlene Bayer, Sanjeev Hingorani, Brian Krafthefer, Kevin Kwong, Chang-Seo Lee, Paolo Tronville
 2. Four Voting Members rolling on: Bob Burkhead, Mike Corbat, David Schaaf, Marwa Zaatari
 - ii. 122 corresponding members.
 - iii. Matt posted a link to join the TC 2.3 committee.
 1. https://eweb.ashrae.org/eweb/TS_ProvisionalSignup.html
 - iv. Marwa Zaatari will roll up to Chair and Kevin Kwong will roll up to Vice Chair after the summer meeting.
 - v. The TC needs more members from the 'User' category.
 - vi. Bill Lull brought up the idea of establishing coordination between TC 2.3 and TC 9.1 (Large Building Air-Conditioning Systems).
 - c. Planning - Subcommittee Chair – Marwa Zaatari
 - i. A draft presentation talking about TC 2.3 will be posted on Basecamp and on the TC 2.3 website.
 - ii. Kevin presented a draft of a TC 2.3 roadmap. This will be posted on Basecamp.
 - iii. Marwa is monitoring other TC's, MTG's, and the ASHRAE ETF and will send out relevant updates.
 - d. Program - Subcommittee Chair -- KJ Choi
 - i. Three seminars are sponsored for the Winter 2021 Virtual Conference.
 1. Seminar 6: Fighting the Unseen Killers: Gas-Phase Air Cleaners
 2. Seminar 35: Sensors and IAQ
 3. Seminar 78: Supplementing Ventilation with Gas-phase Air Cleaning (IEA-EBC Annex 78)
 - ii. One workshop was submitted but not accepted.
 - iii. One seminar and one workshop were submitted for Phoenix. One paper (Chang-Seo) was accepted for Phoenix.
 - iv. Bill is working with EHC on some presentations. He will send to Marilyn (Publications) and will copy both Marilyn and Paolo on EHC communications.
 - v. Ashish pointed out a related paper in the Conference Paper Session 21 titled "Gaseous By-Products Generated from UV-PCO Process: A Review".
 - e. ASHRAE Learning Institute – Marilyn Listvan
 - i. No updates from ALI.
 - ii. Chris had previously communicated with Barney on putting several courses together for submission to ALI. Chris will check in with Barney.
 - f. Publications - Subcommittee Chair -- Marilyn Listvan
 - i. Gemma sent a list of publications to Marilyn. Marilyn sent this list to Paula for the website. Marilyn will also post on the LinkedIn pages.
 - g. Research - Subcommittee Chair – Paula Levasseur

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- i. Research funding is on hold until in-person meetings restart. RAC is still accepting and encouraging submissions of RTARs and Work Statements.
 - ii. Paula reminded the attendees that all research topics must have co-sponsor votes and must be reviewed by the Research Liaison Bill Hutzel.
 - iii. AHAM is working on chamber test methods for chemicals and microbes.
 - iv. Bill Lull recommended corresponding with TC 9.1.
 - 1. Paula will email the TC 9.1 Chair.
- h. Standards - Subcommittee Chair – Michael Sherber
- i. SSPC 145 updates will be included in the Standards subcommittee minutes.
- i. Website - Subcommittee Chair -- Paula Levasseur (Incoming Chair - Caitlin Naske)
- i. This is the last meeting as subcommittee Chair for Paula. Caitlin will be taking over the website.
 - ii. It is probably not possible to link to LinkedIn from the TC 2.3 website.
 - 1. ASHRAE does not want links to personal/company emails or websites.
 - iii. Bill Lull commented that the TC 2.3 website is useful for accessing up-to-date information like minutes.
 - iv. Marilyn will put a link to the TC 2.3 website on the LinkedIn page.
- j. SSPC145 – Committee Chair – Tony Abate
- i. The committee is entering a crossroads due to the inclusion of electronic air cleaners into the 145.2 test method.
 - ii. The committee will review the first draft of extensive 145.2 changes from 1838-RP.
 - iii. Bill Lull commented that the environmental conditions are an issue with the test method. He will bring this issue up at the SSPC 145 meeting.

6. Report from TC liaisons

- a. Hank Greist – TC 2.9
 - i. Collaborating with TC 2.3 on programs and future standards work.
 - ii. 185.3 is due for a ASHRAE Standards committee vote next week.
 - iii. There is collaboration with many outside groups (e.g. IUVA) on the development of memorandum of understanding.
 - iv. The TC's focus is on reaching out to other TCs to share resources.
- b. Nick Agopian – 62.2
 - i. Ongoing issues with unvented combustion devices. There is an RTAR on this issue. The committee wants to move forward with banning unvented combustion devices.
 - ii. Currently, there is a recommendation for a filter but only to protect cooling coils and not to protect occupants.
- c. Nick Agopian – TRG-IAQP
 - i. Marwa has stepped down as Chair.
 - ii. There are some issues with getting this group going at ASHRAE. Nick will meet with Dean and Victoria on a path forward.
 - iii. Maintain TRG-IAQP as a resource for outside groups.
- d. Nick Agopian - 62.1 (Incoming Liaison – Marwa Zaatari)

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- i. 62.1 will be divided into multiple subcommittees.
 - ii. There are regular meetings in-between ASHRAE meetings.
 - iii. There is a new guideline for public review – 42P (enhanced indoor air quality guide).
 - iv. IAQP is very relevant to 62.1 for both particulates and gases. An addendum has been in the works for the past 4-years and is on the way to publishing. There will be a list of design compounds and target limits. The idea is you cannot just decrease outside air, but you need to also consider indoor pollutants.
 - v. There are 2 new addenda regarding both particulate and gaseous by-products.
 - vi. A carbon dioxide addendum is a work in progress.
- e. Jensen Zhang – EHC
- i. Charlene provided the update on EHC.
 - ii. A Position Document on air cleaning and health is due for revision. Pawel will be Chair of the committee.
 - iii. Much of the meeting time was spent on infectious diseases. A new Position Document on infectious diseases is in the works. Bill Bahnfleth is the primary contact.
 - iv. EHC is holding virtual seminars at least 4 times a year. There were over 100 Zoom participants at the last seminar.
 - v. Charlene will chair a session in the spring on wildfires, hurricanes, and other natural disasters and their effects on indoor air.
 - 1. Charlene is looking for a someone to put together a panel on this topic for IAQ 2020
 - vi. Charlene will give dates and times of upcoming seminars to Sanjeev for circulation to TC 2.3.
- f. Brian Krafthefer – TC 4.10
- i. Developing contaminant transport modeling.
 - ii. Brian recommended reviewers from TC 2.3 to look at gaseous contaminant modeling.
 - iii. RP-1675 is on modeling data center. They are looking for test data to feed into the model.
 - iv. 2 Work Statements
 - 1. One key WS is on particulate inhalation modeling of aircraft cabins.
 - v. Several RTARS
 - 1. One key RTAR is on environmental modeling for spaces and test chambers.
- g. Tony Abate – TC 4.3
- i. No updates
- h. Dara Feddersen – TC 2.4
- i. No updates
- i. Kevin Kwong – U.S. TAG to ISO/TC 142
- i. WG8 - Gas-Phase Air Cleaning Devices
 - 1. ISO 10121: Test method for assessing the performance of gas-phase air cleaning media and devices for general ventilation.
 - a. DIS draft should be filed soon for ISO 10121-3 (classification system for gas-phase air cleaning devices)
 - b. Lab testing delayed due to the pandemic.
 - c. Initial results indicate lower test concentrations are needed.
 - d. Lowered challenge concentration to 9 ppm for all four pollutants.



7. New Business

- a. WS-1869 “Evaluation of VOCs with Respect to Development of Revised Standard 62.1 Indoor Air Quality Procedure (IAQP) Design Compounds and Design Limits”
 - i. Marwa thinks this Work Statement is ready for a vote. TC 2.3 is the sponsoring committee.
 - ii. This will be co-sponsored by 62.1.
 - iii. Gemma has reviewed and is happy with the content.
 - iv. There are some author and bidder conflicts.
 - 1. Paolo – Potential bidders can work on the Work Statement but there needs to have more than 1 bidder.
- b. Bill Lull asked for a volunteer to be the TC 9.1 liaison
 - i. Paula will try to attend the TC 9.1 meeting

8. Agenda suggestions for the Summer Meeting in Phoenix, AZ, June 26-30, 2021

- i. Chris Muller recommended keeping the planning meeting virtual and in the afternoon instead of the usual morning meeting timeslot.

9. The meeting was adjourned @ 3:34pm