

# Draft Minutes - Main Committee Meeting

## TC 2.4 Particulate Contaminants/Removal Equipment

Atlanta, Tuesday June 30, 2015

3:30-6:00 pm

Salon E (2) Atlanta Hilton

1. TC Chair Tom Justice called the meeting to order at 3:35 pm.
2. Attendees introduced themselves. About 52 people were in attendance including 18 Corresponding Members (CM) and 19 guests. Section 2 Head Tom Sobieski noted that this was his last meeting, and that the incoming liaison is Bert Phillips. There were no other liaisons present.
3. Secretary Gemma Kerr distributed sign-up sheets, and made the roll call of Voting Members. Sixteen VM were present. Quorum for this committee is ten VM. VM attendance and Non-Voting Member responsibilities are shown below.

Voting Member	Pres	Abs	Voting Member	Pres	Abs	
Tom Justice (Chair)	X		Kathleen Owen	X		
Eric Brodsky (Handbook)	X		Jeff Siegel (Non-Quorum)	X		
Keith Chesson	X		John Simenson	X		
Mike Corbat (Standards)	X		Brent Stephens	X		
Zied Driss	X		Christine Sun		X	
Randy Haseman		X	Paolo Tronville	x		
Tim Johnson	x		Al Veeck (Membership and Webmaster)	X		
Gemma Kerr (Secretary)	X		Mike Waring (Research)	X		
Brian Krafthefer	X					
Bruce McDonald	X					
Totals				16	2	18

### Non-Voting Officers

Don Thornburg (Vice Chair)

Marilyn Listvan (Program and Publications Chair)

Zied Driss (Research Sub-committee Vice Chair)

John Simenson (Standards Sub-committee Vice Chair)

Dara Feddersen and Donna Sullivan (Program Sub-committee Vice Chairs)

Barney Burroughs (ALI Coordinator)

4. Tom Justice welcomed everyone to the meeting and delivered his opening comments.
  - a. The Agenda, which had been circulated before the meeting, was accepted as distributed;
  - b. ASHRAE is asking people to pay attention to the Code of Ethics, see Attachment 1;
  - c. TC 2.4 has three new recipients of the Distinguished Service Award. They are Tom Kuehn, Steve Nicholas, and Paolo Tronville. They were given an enthusiastic round of applause;

- d. Tom welcomed Dick Rivers back after an absence of several years. He is now 90 years old and has been active in the filtration business for more than 60 years;
  - e. Some rules have changed for TCs; all now must appoint a Membership Chair; and all subcommittees can now schedule conference calls or webinars between meetings. Requests to schedule them should be sent to Mike Vaughn;
  - f. TCs have been asked to review their involvement in and benefit to the residential building sector. This is an area where TC 2.4 is active;
  - g. The deadline for program submissions for Atlanta is August 9. To improve chances of acceptance, please ensure the correct track is selected (contact Track Chair if unsure). Subcommittee Chair Marilyn Listvan can assist in reviewing submissions;
  - h. Two Multi-disciplinary Task Groups are recruiting members. Anyone applying to join needs an up-to-date bio on the ASHRAE website;
  - i. Anyone wishing to be a corresponding member of the TC can now sign up directly to be a provisional CM on the ASHRAE website;
  - j. New TC officer email aliases for 2015-16 have been issued;
  - k. RAC just now is favoring residential research projects and projects on reducing energy consumption of HVAC&R;
  - l. The residential focus means that we need to work more closely with SSPC 62.2;
  - m. We also need to keep an eye on the Department of Energy's Building America project which is targeting practical solutions for low energy homes through their IAQ Road Map.
5. Keith Chesson announced that the Particle Party would take place at Gibney's Pub in the Peachtree Center from 6:30-9:30 pm. The total number interested was around 30, including people from TC 2.3.
6. A motion to approve the Chicago Minutes as distributed was made by Al Veeck and seconded by Michael Waring. The Minutes were approved by a vote of 15-0-1-2-18 (CNV) (Yes-No-Abstain-Absent-Total, (Chair Not Voting)).
7. Gemma Kerr read out details of the one vote taken since the Chicago Meeting. This is shown below:
- a. *WS 1734 - Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing* (lead author Paolo Tronville) was approved for submission to RAC by a vote of 16-0-2-0-18 (Yes-No-Abstain-Absent-Total). Abstaining votes were the TC Chair and the Research Subcommittee Chair.
8. Subcommittee Reports
- a. Planning Subcommittee Report ..... Gemma Kerr
    - i. The Planning Sub-Committee met 8-10 am Tuesday. About 17 people attended it. The Meeting Minutes are shown in Attachment #2;
    - ii. This Sub-Committee focuses on how things are being done and how we can do better. We get input from the TC and all of the Sub-committees;
    - iii. Successes include the use of webinars to advance the research tasks of preparing RTARs and Work Statements;
    - iv. Things that we would like to do for the future include:
      - 1. Preparing an information package about the TC to show on the website and give to first-time visitors to the TC. Also a TC 2.4 logo to include in the package;
      - 2. Expanding our involvement with other groups, both within and outside of ASHRAE. Possibilities include ASHRAE GPC 29R (Building Security), the DOE Building America program, and the Indoor Air Quality Association (IAQA) which just became part of ASHRAE;

- v. Al Veeck proposed and Brian Krafthefer seconded the motion to approve the Planning Subcommittee Report. The motion was carried by a vote of 15-0-1-2-18 (CNV).
- b. Membership Subcommittee Report ..... Al Veeck
- i. Regarding current voting membership of the TC, Michael Corbat, Zied Driss, Tom Justice, Jeff Siegel, Christine Sun and Al Veeck are rolling off after this Meeting. Six new VM will roll on to keep the total number at 18. They are Bob Burkhead, Barney Burroughs, Geoff Crosby, Todd McGrath, Michael Sexsmith, and John Zhang;
  - ii. Incoming TC officers are as follows: Gemma Kerr moves to Chair, Don Thornburg remains as Vice Chair, Mike Corbat becomes Secretary. John Simenson will take over the Standards Subcommittee with Anja Coenen as Vice Chair. Jennifer Wong will become Membership Vice Chair.
  - iii. Al informed the meeting that he is retiring in September this year. He said it had been a privilege to work with members of the TC and to enjoy Particle Parties, and received a round of applause for his contributions to the TC;
  - iv. Bruce McDonald proposed and Gemma Kerr seconded the motion to approve the Membership Subcommittee Report. The motion was carried by a vote of 15-0-1-2-18 (CNV).
- c. Research Subcommittee Report ..... Michael Waring
- i. The Research Subcommittee met 3-5 pm Sunday;
  - ii. The Meeting Minutes are shown in Attachment #3;
  - iii. News from the Research Chairs' breakfast was that ASHRAE currently has 61 active research projects worth \$10M. There are no projects on hold due to lack of funds. There are several RTARs and Work Statements under review. There is also now a protocol for acceptance of unsolicited research proposals (URPs);
  - iv. Regarding TC 2.4 projects: WS 1649 was provisionally approved and has been revised; WS 1734 (urban aerosol loading dust for GPC 35) was rejected by RAC but will be revised and resubmitted; WS 1756 (low-cost sensors) is in preparation; new RTARs are being written by Dara Feddersen, Al Vantine, and Rahul Bharawaj; The RTAR on Standard 52.2 round robin testing is nearly complete and co-sponsorship votes need to be taken by letter ballot before the RAC submission date of August 15;
  - v. 1691-URP on modeling the effects of particles is now complete. A final presentation was made by PI Brent Stephens to the PMS in Atlanta. The final report has been reviewed, revised to add more data, and is ready for an acceptance vote. This was a successful project;
  - vi. PI Brent Stephens left the room. A motion to accept the final report of 1691-URP was proposed by PMS Chair Bruce McDonald, seconded by Al Veeck, and carried by a vote of 14-0-2-2-18 (CNV);
  - vii. There was discussion of RAC's new requirement to add staged funding to Work Statements. Previously, funds have been disbursed every three months during the project. Tying payments to completion of project milestones will help to ensure accountability of the contractor conducting the research. However, it is not clear whether their employers (universities, government departments) will be prepared to sign contracts of this type. There are likely to be unintended consequences if a project is terminated, and the process of termination when a milestone is not met is unclear. Jeff Siegel pointed out that EHC has sent a letter to RAC asking for more investigation and consultation before implementation of this funding practice. It was decided that a similar letter should be written by TC 2.4 to RAC. The letter should be written by the Research Sub-committee, signed by the TC Chair, and sent to research liaisons Harvey Sachs and Pawel Wargocki, also Mike Vaughn and the Chair of Tech Council;

- viii. A motion to prepare and send the letter was proposed by Michael Waring, seconded by Brian Krafthefer, and carried by a vote of 15-0-1-2-18 (CNV).
  - ix. Gemma Kerr proposed and Bruce McDonald seconded the motion to approve the Research Subcommittee Report. The motion was carried by a vote of 14-0-2-2-18 (CNV).
- d. Standards Subcommittee Report ..... Michael Corbat
- i. The Standards Sub-committee meeting took place Monday 4:15– 6 pm. 25 people attended;
  - ii. The Meeting Minutes are shown in Attachment #4;
  - iii. Standard 52.2’s three new Addenda are in process at present. Two are related to reporting and one requires full test completion for use of MERV;
  - iv. The round robin research project to evaluate the revised standard 52.2 will be ready for submission to RAC by the August 15 deadline;
  - v. GPC 35 has made progress writing the Guideline. The GPC needs the research proposed in WS 1734 before it can complete the writing;
  - vi. The proposal for the residential filter test method has been completed, but needs revision before being voted on. This will need a letter ballot. It was noted that the EU have a proposal for a test method for residential filters in the works. Many buildings there have tight envelopes and are mechanically ventilated;
  - vii. SSPC 180 (Inspection and Maintenance of HVAC) has requested TC 2.4 assistance.
  - viii. Barney Burroughs has re-iterated GPC 29R’s need for more TC 2.4 assistance. Anyone interested should contact Jason DeGraw (phone: 303-384-7395, email: Jason.degraw@nrel.gov);
  - ix. ISO TC 142 Standard 16890 (four parts), which is equivalent to Standard 52.2, is nearing completion. It uses PM as a basis for filter classification rather than MERV, though the starting data are equivalent. No update was available in Atlanta. Information is available from Paolo Tronville, Chair of the ISO TC, or from Matt Middlebrooks, Chair of the US Technical Advisory Group for TC 142;
  - x. Reports from other standards liaisons can be found in the meeting Minutes;
  - xi. A motion to approve the Standards Subcommittee Report was proposed by Bruce McDonald, seconded by Tim Johnson, and carried by a vote of 14-0-2-2-18 (CNV).
- e. Program Sub-committee Report ..... Marilyn Listvan
- i. The Program Sub-committee met on Tuesday from 10-11 with 14 people attending;
  - ii. The Minutes of the Program meeting can be found in Attachment 5;
  - iii. One program was presented in Atlanta: a seminar with title “PM 2.5 and Gases impact on environment and health”. It was co-sponsored by T 2.3;
  - iv. The deadline for Seminar, Workshop and Forum submissions for Orlando is August 10; Two programs were agreed on at the meeting: a forum “In the year 2035, will filtration be alive?” with moderator Brian Krafthefer (this will place during the Monday 3-4 pm time slot); and a seminar “Do we need a separate test standard for residential filters?” with Chair Tom Justice;
  - v. Potential presentations for St Louis and beyond were also discussed;
  - vi. Technical papers can be submitted directly by individuals and get priority. Peer review means that submission now would result in presentation in St. Louis;
  - vii. On behalf of ASHRAE’s Program Committee, Tom Kuehn requested volunteers to review papers submitted on TC 2.4-related topics. Eric Brodsky, Bob Burkhead, Zied Driss, Brian Krafthefer, Marilyn Listvan and Jeff Siegel agreed to be reviewers;
- f. Publications Report ..... Marilyn Listvan
- i. The Monday 3-4 pm time slot was booked for the Atlanta meeting, but a misunderstanding led to no program presentation;

- ii. Marilyn asked people to email her with a list of their publications and other papers. The intent is to put a list of useful references on the TC 2.4 website as part of educating and informing viewers.

Zied Driss proposed and Mike Corbat seconded the motion to approve the Program and Publications Subcommittee Reports. The motion was carried by a vote of 15-0-1-2-18 (CNV).

g. Web Master Report ..... Al Veeck

- i. The website is hosted by the National Air Filtration Association, not ASHRAE. Posting items on the site is easier through NAFA, and there is more upload space which enables the TC to post photos;
- ii. Bob Burkhead has agreed to take over as Webmaster when Al retires in September;
- iii. A motion to approve the Web Master Report was proposed by Gemma Kerr, seconded by Paolo Tronville, and carried by a vote of 15-0-1-2-18 (CNV).

h. Handbook Sub-committee Report ..... Eric Brodsky

- i. The Handbook Sub-committee meeting took place Saturday 1-2:30 pm and was attended by about 15 people;
- ii. The Meeting Minutes are shown in Attachment #6;
- iii. Chapter 29, “Air Cleaners for Particulate Contaminants”, in the HVAC Systems and Equipment Handbook has been submitted to ASHRAE and will be re-published in 2016;
- iv. TC 2.4 needs to be more involved with the Fundamentals Handbook Chapter 11 “Air Contaminants”. This chapter is the responsibility of TC 2.3 but contains a significant amount of material on particulate matter. Paolo agreed to attend the TC 2.3 Handbook meeting on behalf of TC 2.4;
- v. Tom Justice has completed the answers for the particle FAQs sent to us by Steve Hammerling. Eric Brodsky agreed to review these and then forward them to the TC Chair to send back to ASHRAE;
- vi. Jeff Siegel proposed and Bruce McDonald seconded the motion to approve the Handbook Sub-committee report. The motion was carried by a vote of 14-0-2-2-18 (CNV).

9. Reports from TC liaisons.

- a. Jeff Siegel reported that EHC has started a research project (1663) to write a residential IAQ Guide. The PMS is active and would like a member of TC 2.3 or 2.4. Eric Brodsky volunteered to become involved;
- b. Mike Corbat reported that SSPC 62.2 has listened to criticism from TC 2.4: “MERV equivalency” has been removed from Addendum K. AHRI 680 and ASHRAE 52.2 are both referenced, and filtration has been added as requested;
- c. Geoff Crosby reported that GPC 35 has made progress on a draft guideline including an energy consumption calculation method presented by Vijay. The research proposed in WS 1734 is very important for making accurate calculations;
- d. Tim Johnson reported on ISO/TC 142 Working Group 3: they are under pressure to complete Standard 16890 (which is the equivalent of 52.2). Parts 1 and 2 have received many comments which are being dealt with, though the US complaints about use of PM<sub>10</sub> have been rejected. Comments on Parts 3 and 4 will be reviewed in September at the TC 142 annual meeting;
- e. Mike Corbat reported that Standard 52.2 will likely be republished in 2016;
- f. Matt Middlebrooks said that the US Technical Advisory Group to ISO/TC 142 is active. There is ongoing controversy over Standard 16890, WG 5 is restarting, and WG 12 (sustainability) will have its first meeting in September. Paolo Tronville, Chair of TC 142, urged people to get

involved with WG 12, it needs more experts now. The US will host the 2016 annual meeting at the ASHRAE HQ in Atlanta;

- g. The British engineering association CIBSE is partnering with ASHRAE on a large project to address security, both physical and electronic. This will start soon, and we may want to get involved.

10. Old Business

- a. No items of Old Business were raised.

11. New Business

- a. Tom Justice, who is retiring from the Chair position after the Atlanta meeting, thanked everyone who had helped him during his two years as Chair, especially the Secretary and Subcommittee Chairs;
- b. Gemma Kerr praised Tom for his knowledge and involvement, and thanked him for doing a splendid job as Chair.

12. The motion to adjourn was carried unanimously. The Meeting was adjourned at 5:25 pm.

## ATTACHMENT #1

**ASHRAE Code Of Ethics** (Approved by ASHRAE Board of Directors January 30, 2013)

1.140.001.1 As members of ASHRAE or participants in ASHRAE committees, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct.

- A. Efforts of the Society, its members, and its bodies shall be directed at all times to enhancing the public health, safety and welfare.
- B. Members and organized bodies of the Society shall be good stewards of the world's resources including energy, natural, human and financial resources.
- C. Our products and services shall be offered only in areas where our competence and expertise can satisfy the public need.
- D. We shall act with care and competence in all activities, using and developing up-to-date knowledge and skills.
- E. We shall avoid real or perceived conflicts of interest whenever possible, and disclose them to affected parties when they do exist.
- F. The confidentiality of business affairs, proprietary information, intellectual property, procedures, and restricted Society discussions and materials shall be respected.
- G. Each member is expected and encouraged to be committed to the code of ethics of his or her own professional or trade association in their nation and area of work.
- H. Activities crossing national and cultural boundaries shall respect the ethical codes of the seat of the principal activity.

## ATTACHMENT #2

# *TC 2.4 Planning Subcommittee –Atlanta* **Meeting Minutes**

**Tuesday, June 30, 2015**

**8:00 – 10:00 am**

**Atlanta Hilton, 3<sup>rd</sup> Floor, Room 303**

**ACTION ITEMS SHOWN IN RED**  
TC 2.4 Committee votes shown in Blue

- 1) The meeting was called to order by Acting Chair Gemma Kerr, who welcomed attendees. Everyone introduced themselves and a sign-up sheet was circulated.
- 2) There being no Agenda, the order of discussion followed the Chicago Minutes.
- 3) Scope for the Planning Subcommittee

*Evaluate and propose methods for improving the operations of TC 2.4 and its subcommittees (herein referred to as committees). This would include recommendations to the committees on "How" and "Why" we are operating as committees, ways to improve participation in TC 2.4 activities, and future activities and direction of the committees. The focus of the planning committee is not intended to be "What" we have done in the committees.*
- 4) Road Map Review & Committee Reports (as needed)
  - a. The TC 2.4 Road Map revised draft was issued to the TC voting members and officers for review, comment and input shortly after Chicago. No further comments were received.
  - b. TC 2.4 Main committee Section
    - i. ASHRAE is currently focusing on residential issues. This is good for TC 2.4, which was already focusing on homes;
    - ii. Membership is doing well. The TC has 18 voting members and about 90 corresponding, and is succeeding in getting young people involved and accepting responsibilities;
    - iii. Using webinars between meetings has been very effective in advancing development of research projects;
    - iv. ASHRAE staff Mike Vaughn and Stephanie Reiniche have been very helpful to keep the TC's plans moving.
  - c. Planning Subcommittee
    - i. The Road Map was discussed briefly. Gemma said that one of its successes was the appointment of liaisons to other groups and committees. Liaisons are expected to report at the TC meeting. The Road Map is short of long-term ideas. No-one had any to add;
    - ii. The idea of producing a visitor packet for first-time attendees at the TC meeting was discussed. It should include explanation of what the TC does, common acronyms, connection with ISO etc. it should also be posted on the website and might be used as a flyer at meeting registration or at Chapter meetings. **Bob Burkhead, Gemma Kerr and Brian Krafthefer were tasked with preparing a draft;**
    - iii. TC 2.4 needs an identity graphic or icon for the flyer, perhaps a dust storm. **Tom Justice will check if Section 2 has one.** There might be useful examples in ASHRAE's IAQ Guide.

Tom Justice, Al Veeck, Barney Burroughs and Marilyn Listvan agreed to work on producing a TC 2.4 icon by Orlando;

- d. Membership Subcommittee
  - i. Tom Justice will be taking over from Al Veeck as Membership Chair. Tom will recruit a Vice Chair (this is a new position);
  - ii. Tom said that he would like to recruit some younger greeters to assist at the door before the TC meeting;
  - iii. Barney Burroughs suggested shadowing of leaders (mentoring) to help newer members learn about TC officer responsibilities;
  - iv. Marilyn announced that TC 2.4 has three members receiving the Distinguished Service Award at the Atlanta meeting. They are Steve Nicholas, Paolo Tronville and Tom Kuehn.
- e. Research Subcommittee
  - i. This committee is functioning well with much activity between meetings;
  - ii. Brent Stephens' particle modeling project was very successful. He over-delivered on the work and made an outstanding presentation in Atlanta;
- f. Standards Subcommittee
  - i. John Simonsen will take over as Standards Sub-committee Chair after the Atlanta meeting. Anja Coenen has offered to be Vice Chair;
  - ii. John will be championing the new residential standard;
  - iii. Resolution of the issues between ASHRAE 52.2 and ISO 16890 cannot occur until 16890 is published. Now it is still changing too rapidly.
- g. Handbook Subcommittee
  - i. The committee is functioning well.
- h. Website
  - i. Al Veeck is retiring in September. Bob Burkhead offered to take over from him as TC Webmaster. Bob will look for someone to assist him as Vice Chair. The new NAFA contact will be Terry Driscoll;
  - ii. The chain of posting should be TC Chair to Webmaster to NAFA contact;
  - iii. Planning needs to be added to the list of Sub-committees;
  - iv. The Road Map is not currently on the website. It was suggested that a new section be created on the Home Page with name "Our Plan" or "About Us" and that the Road Map be posted there;

#### 5) New Business

- a. Barney Burroughs noted that GPC 29R (Building Security) needs input from people with expertise in particle filtration. Anyone interested in becoming a member should apply to ASHRAE after filling out the conflict of interest form and updating their bio;
- b. Barney Burroughs reported that GPC 10 (environmental parameters interactions) has become an SGPC, and suggested that we check whether their activities are relevant to TC 2.4
- c. It was noted that the Indoor Air Quality Association (IAQA) is now a part of ASHRAE. Their position on filtration is not known. Gemma Kerr will talk to Don Weekes about this.
- d. Tom Justice advised that the TC look at DOE's Building America program. One of its major goals is the use of filtration to improve residential IAQ. It has developed a road map for codes and standards. The program is a member along with ASHRAE of an alliance run by Iain Walker.

#### 6) Meeting adjourned at 9:10 am.

## ATTACHMENT #3

### ASHRAE RESEARCH SUBCOMMITTEE MEETING MINUTES Atlanta, GA

#### TC2.4 – Particulate Air Contaminants/Removal Equipment

Sunday, June 28, 2015

3:00 – 5:00 PM

Location: Pavilion 8

1. Call to Order (*The meeting began at 3:01 PM.*)
2. Introductions (*44 people attended the meeting.*)
3. Review of Agenda (*Chair reviewed the agenda.*)
4. Chair's Comments
5. Work Statement and RTAR activity between meetings
  - a. 1649-WS Impact of Higher Efficiency Filtration on IAQ in Residential Environments with Central HVAC – Champion: Tom Justice (*Tentatively approved, worked with Harvey Sachs to get approval, in TRP stage currently, this will go out for bid in the next cycle in Fall 2015.*)
  - b. 1734-WS, Reproducing the Typical Urban Atmospheric Aerosol in Laboratory for Air Filter Loading – Champions: Paolo Tronville and Geoff Crosby, Cosponsored by SSPC 52.2 (*Submitted to RAC by May 15 deadline, considered this cycle; this WS was rejected on the basis that the comments on the RTAR were not fully addressed in preparation of the work statement. Need to add comment addressing VERY CLEARLY, and include cover letter in resubmission because it is a precursor to GPC 35. This WS will be resubmitted for the next RAC deadline.*)
  - c. RTAR 1756, Evaluation of low-cost particle and CO2 sensors for indoor air quality monitoring in smart building systems – Champion: Brent Stephens, Cosponsored by TC 1.2 (*Tentatively approved by RAC, Brent is working on it; Need to find co-author (perhaps smart building systems, clean rooms, health care); Others are willing to work on the WS: Vijay (who is also on clean rooms); Heejin Cho (MS State Univ); Zied D. may help with healthcare connections.*)
6. RTAR activity between meetings
  - a. 1626-RTAR Energy Implications of Air Filtration in Commercial Buildings (*Champion: Dara Fedderson, discussed later in meeting*)
  - b. Effect of HVAC systems on airborne viral species fate, transport, control, and infection risk – Champion: Parham Azimi (*Draft of RTAR written, not submitted, discussed below*)
7. Cosponsored Projects (for reference only)
  - a. TC 2.1 – 1624-RP Effective Energy Efficient School Classroom Ventilation (*Bid won by DANISH TECHNOLOGICAL INST. - Arhus, Denmark*)

Does anyone know anything about this? We co-sponsored but we don't have a rep on the PMS or anything. No information.

8. Current Research Project

- a. RP-1691 Modeling the impact of residential HVAC filtration on indoor particles of outdoor origin. *(Final report submitted, Brent Stephens presented a summary of his work. TC voted at main meeting on Tuesday to accept the final report.)*

9. Work time on any RTAR, WS and other proposals for remainder of the meeting time

- a. 1626-RTAR Energy Implications of Air Filtration in Commercial Buildings *(Dara Fedderson wrote a draft that Harvey Sachs read; he believed the RTAR was problematic, and said: If the 1299-RP showed that the impact of high efficiency filtration did not rise the signal of overall system level energy to be impactful, that the case should be better made about why it is expected to be so in larger, built up systems (and show so with a scaling or sensitivity analysis). He also objected to the way commercial systems were treated as a lumped entity, when they can be RTUs of various types, built up systems that can be CAV or VAV, etc. He thought if the scaling analysis could justify the types of systems that would likely be most impacted, then the study could focus on those types. Suggested dropping. This was discussed at length during the meeting. A group meeting was schedule to work out a new focus for the RTAR that addresses some of Harvey's comments.)*
- b. Impact on performance (efficiency and pressure drop) of air filters in high humidity and free moisture conditions. *(Bob Burkhead had said he would have a draft to submit to RAC by the next deadline, which is August 15. Dave Matier and Paolo Tronville discussed helping.)*
- c. Effect of HVAC systems on airborne viral species fate, transport, control, and infection risk *(Parham Azimi wrote a draft of this RTAR. Brent Stephens summarized it. Al Vatine and Zied Driss are part of it, as well. The RTAR was reduced in scope to be in a test rig to look at removal efficiency of viruses, but Al would prefer to have it be experiments in a real building with different MERV filters. The group advised looking more into the work that had been done on this and to talk to other TCs.)*
- d. Particle removal by building envelopes *(Skipped)*
- e. RTAR on Round Robin with current 52.2 *(This was approved by 52.2, and we will vote on co-sponsoring with a letter ballot.)*
- f. Embedded sensors in filters. *(Skipped)*
- g. Develop a test method to evaluate the longevity efficiency of electrostatically charged media as an alternative to IPA discharge method *(Champion: Rahul Bharadwaj with help from Al Vatine and John Zhang. Rough draft written, and Rahul will email Michael Waring the RTAR.)*
- h. Characterizing residential mechanical ventilation filtration *(Brent Stephens, skipped)*
- i. Developing a database of commercial and residential filtration stats -- efficiency, pressure drop @ X IWC, etc. *(Brent Stephens, skipped)*

j. Impact of filtration on secondary organic aerosol *(Michael Waring, skipped)*

10. Liaison Report *(Pawel Wargocki is becoming RAC liaison, WS 1734 was rejected and he will give feedback to us ASAP)*

11. Adjournment *(Meeting was adjourned at 4:55 PM)*

## ATTACHMENT #4

### MEETING MINUTES TC 2.4 STANDARDS SUBCOMMITTEE

Monday, 29 June, 2015  
Room 303 (3)  
Atlanta, GA  
4:15 p.m. – 6:00 p.m.

#### Introductions

#### Chair's comments

Review proposed agenda

#### 1) Update on standards and MTGs within scope of TC 2.4:

##### a) **SSPC 52.2 M.o.T. Air Cleaners for Particle Size Efficiency** – Michael Corbat

- i) Targeting a 2016 republication
- ii) 3 Addendum Votes
  - (1) Vote to make full test requirement to use MERV approved
  - (2) Inclusion of all data points (72 efficiency points) required in report will be sent out for letter ballot
  - (3) Inclusion of E values as mandatory has been referred to a committee
- iii) Voted to approve a new test method for residential
- iv) Voted to approve an informational appendix for multi-stage filter testing
- v) Voted to send RTAR for a new Round Robin to RAC

##### b) **GPC 35** – Geoff Crosby

- i) Submitted Work Statement for approval in Fall 2014. GPC is assuming no issues, as Geoff has been told “no news is good news”
- ii) Working draft is in place, with Methodology that is being pursued (Vijay)
- iii) RTAR around synthetic aerosol was rejected – trying to understand why. Geoff and Paolo trying to resubmit as soon as possible (Fall 2015).

#### 2) ASHRAE Liaisons:

##### a) **TC 2.3 – Gaseous Filtration** – Kathleen Owen

- (1) Nothing to report from Research. No other meetings yet
- ii) **SSPC 145.1 Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Media)**
  - (1) Republished. Massive rewrites for easier utilization
- iii) **SSPC145. 2, Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Filter)**
  - (1) Working toward adding electronic/reactive air cleaners

##### b) **TC 2.9 – UV Air & Surface Treatment** – Matt Middlebrooks

- (1) Nothing really new
- (2) Talking about a new GPC (upper air) – hasn't been approved or started.
- (3) Continuing Research Project looking at effect of UV radiation on other components in duct.
  - (a) High dosage rates done, now looking at low dosage rates.
  - (b) If you have anything new/novel to be tested, Matt can connect you with the right people.

##### ii) **SPC 185.1P Elimination of Microbial Contaminants in Air**

- (1) Take the P away – has been published

##### iii) **SPC 185.2 Elimination of Microbial Contaminants on surface**

- (1) No change

##### c) **TC 5.4 – Industrial Air Cleaning** – Bruce McDonald

- (1) Nothing relative to 2.4
- ii) **SPC 199 – MOT for Rating the Performance of Industrial Pulse Cleaned Dust Collectors**
  - (1) New chair and is sending draft for public review

##### d) **TC 9.6 – Health Care Facilities** – Zied Driss

- (1) RTAR for Viral Species and Sensor (2 different). Committee has interest in co-sponsorship.
- (2) Requesting independent volunteer to present on filtration and filtration testing (15 minutes). Meets on Sunday 5PM-7PM. If interested in giving a presentation, contact Zied or Michael Corbat.

ii) **SSPC 170 – Ventilation of Healthcare Facilities** – Zied Driss

- (1) 6 Addenda in process, 3 published. Working on Filtration table, changing from MERV 7 to 8. Including Appendix J as informative is a possibility. Meeting from on Tuesday 8-1.

e) **SSPC 62.1 – Commercial Ventilation** – Charlie Seyffer

- i) Little to report – relatively quiet. New chair next year.

f) **SSPC 62.2 – Residential Ventilation** – Brent Stephens

- i) Straw ballot to keep Addendum K (filtration credit) as part of the standard. Will remove MERV equivalency and split the table that lists both AHRI 680 and 52.2 to reduce opportunity of implying equivalency.

g) **SSPC 90.1 Energy Eff. Design of New Bldg** – Christine Sun

- i) No update

h) **SSPC 161 – Air Quality in Commercial Aircraft** – D. Matier

- i) No update – consider pulling from the agenda. Not relevant.

i) **SPC 180 – Inspection & Maintenance of HVAC Systems** – Phil Maybe

- i) Contact Phil beforehand next time
- ii) There are a lot sections that apply to air filtration – check during main meeting to make sure someone attends. Meets Friday from 2PM to 6PM.

j) **SPC 189.1 ASHRAE/USGBC/IESNA Standard for the Design of High-Performance Green Buildings except Low-Rise Residential Buildings (?inclusion of IAQ)** – Charlie Seyffer

- i) Meets tomorrow, nothing at the last meeting (Chicago)

k) **SPC 189.2 Design, Construction and Operation of High-Performance Green Healthcare Facilities (?inclusion of IAQ)** –

l) **US TAG for ISO TC142** – Matt Middlebrooks

- i) Ongoing discussion/frustration with 16890 parts 1-4. Trying to figure out how to communicate concerns directly with other countries.
- ii) All parts are in DIS status, and will all come together for vote as FDIS.
- iii) At this point in time, US intends to vote “no” on 3 & 4. Paolo advises that there’s still time to gather the comments in a formal letter – some comments have not been properly addressed. To vote “no” does not necessarily make the TC consider the comments more seriously

m) **GPC 23 Guideline for the Design/Application of HVAC Equip. for Rail Passenger Vehicles** – Tom Justice

- i) Tom hasn’t been to the last two meetings due to conflicts – somebody else want to volunteer for mtg. on Weds?

n) **Environmental Health Committee** – Barney Burroughs

- i) Nothing of consequence for 2.4

3) **Old Business**

a) **Report of Working Group Regarding: Proposal for new standard regarding residential filter test method** – Tom Justice, Chair

- i) Tom has drafted title/purpose/scope for review during the meeting. Title is in line with 52.2.
- ii) Prioritization - everything with “residential” seems to go to the top of the pile at ASHRAE
- iii) Classification of document can be “rating” and “MOT”
- iv) Show of support from SSPC 52.2
  - (1) ~25 people have shown interest in being involved in new SSPC
- v) “Straw” review of scope by ASHRAE Standards committee. Tom is rewriting to address list of comments.
  - (1) Revised version by next ASHRAE Standards Committee meeting in October 2015.
- vi) Tom has volunteered as chair of a new committee. Having a named chair is beneficial to the process.
- vii) Looking for volunteers in subcommittee to review
  - (1) Standards subcommittee chair will review

4) **New Business**

a) ASHRAE has announced a new MTG on operations and maintenance activities that impact energy efficiency (just approved – no number assigned yet)

- i) Looking for members from TCs that can contribute to the committee. Consider delegating to GPC 35 member

b) Meeting ended early relative to scheduled time. TC 2.4 chair may consider scheduling the meeting for

1.5 hrs instead of 2 hrs. This could allow the TC 2.3 meeting (immediately following) to finish earlier in the evening.

- c) Add GPC 29R to the list. GPC 29 is Guideline for Risk Management of Public Health and Safety in Buildings.
- d) Make sure someone attends SSPC 180 - Inspection & Maintenance of HVAC Systems. Meets Friday from 2PM to 6PM.

**5) Information Exchange:**

**a) AFS – KJ Choi –**

- i) Advanced Technologies in Filter Media Conference: October 5-8 Franklin, TN
- ii) Oil & Gas and Chemical Processing Filtration and Separation Conference 5/9-11: Houston, TX
- iii) World Filtration Congress: 4/11-16 Taipei, Taiwan

**b) CEN/TC 195 – Air Filters for General Air Cleaning – Paolo Tronville**

- i) TC is not meeting because of all the work items are voted on in parallel with TC 142.
- ii) Only WG6 is active – execution of Mandate M/461
  - (1) Developing 2 test methods, measuring flat sheet of filter media
    - (a) 20-500 nm – Standard
    - (b) 3-30 nm – Technical Specification

**c) Eurovent – Paolo Tronville**

- i) Did not attend last meeting during Filtech exhibition.
- ii) 4.21 is available now on the website
  - (1) Same but without classification table. Separating classification from document.
- iii) Working on developing test method for residential filters.
  - (1) Market is increasing in Europe – buildings are getting tighter. Mechanical ventilation requires a filter. Sizes and flow rates are very different.
  - (2) This could be informative to new SSPC for residential filter test method. Getting difficult to keep track of all the standards (80 numbers...)

**d) IEST – Institute of Environmental Sciences and Technology – Vijay**

- i) No update

**e) INDA – International Nonwovens Development Association –**

- i) FILTRATION show will be in Chicago – Navy Pier. November 17-19, 2015
  - (1) Bob Burkhead, Bruce McDonald, and Chris Fischer will be giving presentations during the show.

**f) ISO TC 142 – Cleaning Equipment for Air and Other Gases – P. Tronville**

- i) Pull this agenda item from the meeting and discuss in US TAG portion instead
- ii) Working on US hosting next meeting. Invitation should be coming in the near future.

**g) NAFA – A. Veeck**

- i) Annual Conference is in Key West, FL at the Westin Hotel – August 26-28, 2015
- ii) Stephen Nicholas will be liaison in the future.

**h) ISO TC 22/SC 7/WG 3 & WG 11 – Paolo Tronville**

- i) WG11 - CCV filtration, even less applicable to this group. Maybe not worth keeping on the agenda. Bruce McDonald provided the update
- ii) WG3 – revision of 12103 ISO fine dust definition. Will finish in September. US TAG from SAE will vote on it.
  - (1) Two new contaminants (soot, ultrafine salt):
    - (a) Soot aerosol – new work item was passed.
      - (i) Japanese have been using for ~12 years.
      - (ii) Diffusion flame generator – very repeatable/reproducible.
      - (iii) Written standard to include a dry soot (elemental carbon), and also a “sticky” soot 80% elemental/ 20% organic
    - (b) Sub-micron salt aerosol – new work item is being proposed.

**i) UL 900 – R. Haseman**

- i) No update

**j) IAQ Meetings – J. Siegel**

- i) No update

**6) Adjourn – 6:00 pm**

**7) Attendees**

	<b>Name</b>	<b>Company/Address</b>	<b>Email</b>
1	Michael Corbat (Chair)	Filtration Group	
2	John Simenson (Vice-Chair)	Johns Manville	
3	Stephen Nicholas	Air Industries, Inc.	
4	Kyung-Ju Choi	Clean & Science	
5	Joel Davis	Flanders Filters	
6	Matt Middlebrooks	Filtration Group	
7	Peter Freeman	Sacobi Carbons	
8	Tony Abate	AtmosAir	
9	Anja Coenen	Freudenberg	
10	Rahul Bharadwaj	AAF International	
11	David Matier	Freudenberg	
12	Zied Driss	Camfil	
13	Kathleen Owen	RTI	
14	Keith Chesson	Clarcor Air	
15	Tom Justice	Zene	
16	Bob Burkhead	Blue Heaven Technologies	
17	Paolo Tronville	Politecnico Di Torino	
18	Bruce McDonald	Retired	
19	Tim Johnson	TSI	
20	Len Duello	Georgia-Pacific	
21	Charlie Seyffer	Camfil	
22	Dan Mason	Bioclimatic	
23	Matt Ball	Koch Filter	
24	Geoff Crosby	Lydall	
25	Thad Ptak	Columbus Industries	

## [ATTACHMENT #5](#)

# TC 2.4 Program Subcommittee Meeting – Atlanta

30-Jun-2015

Tuesday 10:00 – 11:00 (room 303)

14 attended, one Seminar was accepted for Atlanta (Sem 22: PM 2.5 and Gases Impact on Environment & Health, cosponsored 2.3)

**NEED writing clearer outcomes of expected discussion for Forums & Seminars & SEND Abstracts for feedback to ML**

- **Track 1: Systems and Equipment** Track Chair: Gary C. Debes, Email: gcdebes@verizon.net  
This track will assist designers, engineers, and operators in the design, selection, and operation of HVAC&R systems and equipment.
- **Track 2: Fundamentals & Applications** Chair: Cynthia Moreno, Email: cindym@tmmechanical.com  
Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow, IAQ, and building envelope.
- **Track 3: Design Build** Track Chair: James Liston jfliston@verizon.net  
This track explores the challenges and benefits of D-B project delivery. Highlight successful projects; discuss contracts; review management responsibilities; offer alternative design and construction processes. These topics and more will be included.
- **Track 4: International Design** Track Chair: Leon Shapiro leoneshapiro@gmail.com  
HVAC&R systems vary globally and this track provides an opportunity to share innovative and necessary design elements that can be shared internationally.
- **Track 5: Standards, Guidelines and Codes** Chair: Michael Collarin, Michael.Collarin@parsons.com  
The series of sessions in this track highlight the changes to the standards and guidelines, their projected path and optimum design techniques to meet or exceed the standards.
- **Track 6: Cutting-Edge Technologies** Track Chair: Ann Peratt, Email: aggregg.ksu@gmail.com  
This track will include the most recent advances in HVAC&R system design, equipment, and construction techniques. Programs included will focus on efficiency, responsible use of resources and energy recovery.
- **Track 7: The Great Debate** Track Chair: Chuck Curlin, Email: ccurlin@shultzeg.com  
Engineers commonly weigh multiple solutions to find the best match for a certain project.
- **Track 8: Modern Residential Systems** Chair: Jennifer E. Leach, pennst8jen@yahoo.com  
From glazing to water heating to lighting, this track will provide you with the latest advances for the residential market.  
**Conference Program Chair: Jennifer Leach, Email: pennst8jen@yahoo.com**  
**Tom Kuehn has the overall Program responsibility for St. Louis; Tony Giometti is ASHRAE staff contact**

**Workshops need Learning OBJECTIVES written**

**(Includes Bio, Learning Objectives and Methods of Assessment).**

ORLANDO seminar & forum & Workshop proposals (abstracts) deadline = **August 10th**

>>>>

**Learning Objectives:** The Learning Objectives should complete the statement, "After attending this session, the attendees will be able to..." Learning Objectives need to be addressed by the speakers and should use measurable verbs such as "Explain," "Describe," "Distinguish," "Design," "Apply," etc.:

**Proposed for Future Orlando =**

**Jan 23-27, 2016**

Type	Title	CoSponsor	Chair
<b>FORUM Monday 3-4</b>	In the year 2035, will filtration be alive? (what will it look like?)...or Back to the Future, what will Filtration look like?	2.3, 2.4	Brian Krafthefer
<b>Seminar</b>	Do we Need a Separate Test Standard for Residential Filters?	2.4, 2.3	Tom Justice (John Zhang, Thad Ptak, Brian Krafthefer and Brent Stephens/ Mike Waring/Ian Walker)

**Proposed for Future St. Louis =**

**June , 2016**

Type	Title	CoSponsor	Chair
<b>Seminar</b>	You bet your life: Particulate Matter, matters!! (possible health effects of ultrafines: Bill Bahnfleth(Al Veeck contact); autism (EPA= C Seyffer contact, Long Beach) or cardio-vascular= Al Veeck contacts, U of Maryland)LBL speaker (Singer?) -what about ozone interest? & Kathleen's talk: Truth or Consequences; what does a Filter really catch? (RP 1360)	2.5, EHC?, IEQ-GA	Marilyn Listvan
<b>Tech paper (paper due 9/14/2015)</b>	Expert's Advice on Saving Energy with Filters; What you don't know can Co\$T you. (Steve Nicholas' talk/paper: "Hidden Energy co\$ts right before your eyes")	2.3, 52.2 ?	Brian Krafthefer Steve N & Paolo T (Intl, later)

<b>Conf. paper (Abstract due 9/14/2015)</b>	<b>Filtration for Hospitals</b> (from NY seminar speakers and/or John Horns, 3M; Jennifer Wagner; Wayne Thomann; Tom Justice's suggestion _____, Cook Cnty Hospital cost/payback/corresponding lower reinfection rates)		Zied Driss or ??
<b>Conf. paper (Abstract due 9/14/2015)</b>	How can Filters be rated by their PM ( PM1, PM 2.5, PM 10, etc.) performance? (Thad Ptak, Bret Stevens?, Michael Waring?, Bruce McDonald)	52.2 ?	Don Thornburg Brent Stephens / Michael Waring

Newer ideas - Vegas and /or beyond

<b>Seminar</b>	<b>Smart Filters (Sensors &amp; Filter Operations)</b>	<b>2.4, 2.3</b>	Brian Krafthefer	
	<b>Future Filtration Technology</b>			
<b>Tech paper(s)</b>	<b>Climate Degradation effects on Filtration</b>		Brian Krafthefer	
Al Veeck Tim Johnson Brian Krafthefer Kyung-Ju (K J) Choi Gemma Kerr Sanjeev Hingorani Tom Justice Joel Davis Steve Nicholas Kathleen Owen John Zhang Len Duello Thad Ptak  Donna Sullivan (NP) Dara Feddersen (NP)  Marilyn Listvan	Dr. Sanjay Rajagopalan Bill Bahnfleth Wayne Thomas Jennifer Wagner			
		<b>THESE WERE SEATTLE ATTENDEES !!</b>		
		<b>ML APOLOGIES for losing the Chicago info</b>		
		SubComm co-chairs	<b>Donna Sullivan</b>	
		SubComm co-chairs	<b>Dara Feddersen</b>	
		SubComm chair	<b>Marilyn Listvan</b>	

## **ATTACHMENT #6**

### **ASHRAE MEETING MINUTES – Atlanta TC 2.4 - Particulate Contaminants/Removal Equipment**

#### **Handbook Subcommittee Meeting Draft**

**Sat. June 27, 2015 1:00 – 2:30**

1. Call to order 1:00 PM Eric Brodsky, Chair
2. Introductions
3. Attendees (15): Pat Marks, Gemma Kerr, John Simenson, Tom Justice, Eric Brodsky, Keith Chesson, Kyung-Ju Choi, Dan Haas, Len Duello, Brian Krafthefer, Kathleen Owen, Michael Corbat, Zied Driss, Heejin Cho, Sam Cox
4. Session Notes  
Chapter 29 was published in 2012 and updates were submitted to ASHRAE for republication in 2016

The chapter was discussed and there were no updates or recommended changes. Chapter proofs will be reviewed in the fall.

Gemma Kerr commented that Chapter 11, Air Contaminants, in the Fundamentals Handbook includes information about particles, and health effects of various air contaminants. Although the chapter is managed by TC 2.3 Handbook, TC 2.4 should have input. The Fundamental Handbook will be republished in 2017, Gemma will send a draft to Eric Brodsky for input.

Tom Justice commented that the ASHRAE FAQ section includes information about IAQ/Air Filtration. FAQ's include:

What is the allowable level of carbon monoxide in an occupied space? (34)

What is the allowable level of carbon dioxide in an occupied space? (35)

What are the allowable levels of contaminants in the air in an occupied space? (36)

Does ASHRAE publish design guidance or a policy on environmental tobacco smoke in buildings? (97)

5. Next Steps

Review Chapter proof.

6. Other Business- none

Meeting adjourned -2:00

Prepared by Eric Brodsky,

Draft Minutes submitted: 6-30-15 [justfilter@yahoo.com](mailto:justfilter@yahoo.com), gkashrae@magma.ca , patrick.c.marks@jci.com