

## Draft Minutes - Main Committee Meeting

### TC 2.4 Particulate Contaminants/Removal Equipment

Tuesday July 1, 2014

3:30-6:00 pm

Sheraton Seattle

Metropolitan Ballroom B (3, Sheraton)

1. TC Chair Tom Justice called the meeting to order at 3:31 pm.
2. Attendees introduced themselves. About 44 people were in attendance including 20 Corresponding Members (CM) and 13 guests. Section 2 Head Tom Sobieski was present but had no messages for the TC.
3. Secretary Gemma Kerr distributed sign-up sheets, and made the roll call of Voting Members. Eleven of eighteen 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		Gemma Kerr (Secretary)	X	
Nader Barjesteh		X	Kathleen Owen		X
Eric Brodsky (Handbook)	X		Mark Renn		X
Monroe Britt	X		Jeff Siegel (Non-Quorum)	X	
Bob Burkhead	X		Christine Sun		X
Chris Campion		X	Paolo Tronville		X
Mike Corbat (Standards)		X	Al Veeck (Membership and Webmaster)	X	
Zied Driss	X		Mike Waring (Research)	X	
Randy Haseman	X				
Tim Johnson	X				
			Totals	11	7
					18

#### Non-Voting Officers

Don Thornburg (Vice Chair)

Marilyn Listvan (Program and Publications Chair)

Barney Burroughs (ALI Coordinator)

Ken Snider (Alt #1 MTG.EEC)

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 with addition of an item on liaison activities by Barney Burroughs ;
  - b. ASHRAE is asking people to pay attention to the Code of Ethics, see Attachment 1;
  - c. Tom said he was pleased to see so many new faces around the table;

- d. ASHRAE is continuing to promote web conferences/conference calls for TC Subcommittees to allow live discussions between Meetings. Requests to schedule them should be sent to Mike Vaughn;
  - e. ASHRAE has added an Employment Discipline box to their Bio form. Tom asked everyone to check their Bio and fill out the new box;
  - f. ASHRAE is offering to write letters of thanks to employers who pay for their people to attend meetings. Please contact Tom if you would like one sent;
  - g. ASHRAE is looking for more manuscript reviewers;
  - h. Tom verified that the Program and Research Subcommittee Chairs had attended their respective ASHRAE committee meetings;
  - i. Tom would like to see more activity on ASHRAE awards. The TC is allowed to nominate deserving members.
5. Keith Chesson announced that the Particle Party would take place at the Tap House Bar and Grille, 1506 Sixth Avenue, starting at 6:30 pm. The total number interested was around 33, including people from TC 2.3. There will be a \$5 charge to cover the cost of appetizers.
6. A motion to approve the New York Minutes as distributed was made by Al Veeck and seconded by Zied Driss. The Minutes were approved by a vote of 10-0-0-7-18 (Yes-No-Abstain-Absent-Total), Chair Not Voting (CNV).
7. Gemma Kerr read out the record of votes taken since the New York Meeting. They are shown below with finalization dates:
- a. The e-mail vote to co-sponsor with Standing Standards Project Committee (SSPC) 62.1 the seminar in Seattle titled *The Current and Future IAQ Procedure: ASHRAE, LEED, and Beyond* was 15-0-0-2-18 (CNV) (February 4).
  - b. The result of the e-mail ballot seeking approval to forward to the Research Activities Committee (RAC) the Research Topic Acceptance Request (RTAR) titled *Evaluating effectiveness and costs of room air cleaners and central HVAC filtration for controlling particulate matter in residences* was 14-0-1-2-18 (CNV) (April 30).
  - c. The final tally of the e-mail ballot seeking approval to forward to RAC the RTAR developed by Guideline Project Committee (GPC) 35P and titled *Reproducing the Typical Atmospheric Urban Aerosol in Laboratory for Air Filter Loading* was 14-0-1-2-18 (CNV) (May 9).
8. Subcommittee Reports
- a. Planning Subcommittee Report.....Gemma Kerr
    - i. The Planning Sub-Committee met 8-10 am Tuesday and about 20 people participated. 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;
    - iii. There was a useful free-for-all discussion at the meeting. Getting more people involved and participating in the work of the TC, particularly young people, continued to be a theme;
    - iv. In New York, a problem was noted: that other TC's and SPCs make pronouncements on particulate filtration without consulting TC 2.4. It was decided that better communications are required to address this issue, and that we should start sending liaisons to other committees to offer help. This idea has already been received enthusiastically by TG 2, HVAC Security. Gemma requested anyone who attends a meeting where the committee wants our help to contact her;
    - v. The Planning Subcommittee would like to develop a "Road Map" to help the TC move forward and has recruited a team to prepare a draft for Chicago;

- vi. The topic of maintaining standards within ASHRAE versus adopting international standards developed by ISO committees such as TC 142 (Cleaning equipment for air and other gases) was discussed. Opinions were expressed both for and against. It is clear that we are still close to the start of the learning curve on this subject.
  - vii. In New York, it was suggested that TC 2.4 develop a smartphone App for filtration. ASHRAE has a procedure for this which takes about 38 weeks to complete. The best Apps involve a large database, and provide quick and convenient ways to interrogate and use it. There was some inconclusive discussion at the Subcommittee meeting, and the topic was referred to the TC. After some discussion, when no suitable topic for a filtration App had been identified, the TC voted informally not to proceed with developing an App at this time;
  - viii. Zied Driss proposed and Tim Johnson seconded the motion to approve the Planning Subcommittee Report. The motion was carried by a vote of 9-0-1-7-18 (CNV).
- b. Membership Subcommittee Report.....Al Veeck
- i. Al welcomed the eight new CM who were in attendance;
  - ii. Regarding current voting membership of the TC, Nader Barjesteh, Chris Campion, Mark Renn, Monroe Britt and Bob Burkhead are rolling off after this Meeting. Five new VM will roll on to keep the total number at 18. These have not yet been approved by ASHRAE;
  - iii. If you wish to become a voting member of the TC, talk to Al Veeck;
  - iv. Note that Awards activity is now part of Membership. Nominations can be put forward by the TC. The Distinguishes Service Award is based on points given for various volunteer services to ASHRAE, while Fellow is determined by a person's documented intellectual achievements;
  - v. Eric Brodsky proposed and Zied Driss seconded the motion to approve the Membership Subcommittee Report. The motion was carried by a vote of 10-0-0-7-18 (CNV).
- c. Research Subcommittee Report..... Michael Waring
- i. The Research Subcommittee met 3-5 pm Sunday with 38 people attending including RAC Liaison Harvey Sachs. His function is to help the TC get their submissions accepted by RAC;
  - ii. The Meeting Minutes are shown in Attachment #3;
  - iii. News from RAC included revision of the RTAR form and changes to the RTAR approval process, as well as changes to research priorities arising from ASHRAE's new Strategic Plan. In future, research projects sponsored by several committees will be looked on more favorably;
  - iv. News from the Research Chairs' breakfast was that ASHRAE currently has 63 approved research projects worth a total of \$10.8M. However, one project, development of a residential design guide, has received no bids;
  - v. The Research Subcommittee's goal is always to have one active project. At present there is one (1691-URP), so need to work to secure another one;
  - vi. TC 2.4's Work Statement 1649 on residential filters was returned for revision a second time by RAC. A team is working on it so it can be resubmitted in August or December;
  - vii. 1691-URP on modeling the effects of particles started on April 1. The June progress report was accepted in advance of the meeting, and a presentation was made at a separate meeting dedicated to the project;
  - viii. The two RTARs approved by the TC between the New York and Seattle meetings (urban aerosol, and residential air cleaners) were submitted to RAC and have already been returned with comments on how to improve them. Harvey also has some suggestions;
  - ix. The 52.2 lab test RTAR is not yet written, and will need a formal vote for co-sponsorship when ready;
  - x. A number of other ideas for RTARs were discussed at the Subcommittee meeting;

- xii. Mike expressed his thanks to everyone who participated in the meeting and was pleased by the number of new volunteers.
  - xii. Jeff Siegel proposed and Eric Brodsky seconded the motion to approve the Research Subcommittee Report. The motion was carried by a vote of 8-0-2-7-18 (CNV).
- d. Standards Subcommittee Report.....John Simenson
- i. The Standards Sub-committee meeting took place Monday 4:15– 6 pm and was a good meeting, attended by 29 people.
  - ii. The Meeting Minutes are shown in Attachment #4;
  - iii. Standard 52.2 has four recent Addenda, two approved and two in Public Review. The topic of IPA vapor conditioning has been tabled. Bob Burkhead is rolling off as Chair, and will be replaced by Mike Corbat. The standard will be republished in 2017;
  - iv. GPC 35 has changed its meeting time to Monday to allow for a longer meeting. The committee did not have a quorum present, and the meeting was chaired by Brad Stanley as Geoff Crosby was absent. There was some useful discussion on rating systems;
  - v. Reports from other liaisons can be found in the meeting Minutes;
  - vi. Details of conferences from the Information Exchange can also be found in the meeting Minutes;
  - vii. A motion to approve the Standards Subcommittee Report was proposed by Tim Johnson, seconded by Mike Waring and carried by a vote of 9-0-1-7-18 (CNV).
- e. Program Sub-committee Report.....Marilyn Listvan
- i. The Program Sub-committee met on Tuesday from 10-11 am and was attended by 17 people;
  - ii. The Meeting Minutes are shown in Attachment #5;
  - iii. No TC 2.4 programs were presented in Seattle. Chris Muller’s seminar, co-sponsored with TC 2.3, was accepted, not presented, and will be resubmitted for Chicago;
  - iv. In Chicago the program focus will be on large buildings and large projects. Atlanta has an IEQ track, which is useful for the TC;
  - v. Two Workshops (one a resubmission), two Seminars (one a resubmission), and a Forum are proposed for Chicago;
  - vi. The success rate with Forum submissions is now very small, with the emphasis shifted to Workshops which are a cross between a Forum and a Seminar. The Moderator needs to supply a learning objective, and a minimum of 2 speakers (each to provide an Abstract);
  - vii. The plan to book the old Publications meeting slot on Monday afternoon was not successful in Seattle. We will try again in Chicago, and, if successful, can run a 1-hour Forum in that slot. ASHRAE will include it in their Technical Program schedule if requested;
  - viii. Al Veeck proposed and Bob Burkhead seconded the motion to approve the Program Subcommittee Report. The motion was carried by a vote of 10-0-0-7-18 (CNV).
- f. Web Master Report .....Al Veeck
- i. Al has implemented a number of changes to the website. These and other recommendations for change are detailed in the Planning Minutes;
  - ii. Note that 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;
  - iii. A motion to approve the Web Master Report was proposed by Tim Johnson, seconded by Monroe Britt and carried by a vote of 10-0-0-7-18 (CNV).

- g. Handbook Sub-committee Report .....Eric Brodsky
  - i. The Handbook Sub-committee meeting took place Saturday 1-2:30 pm and was attended by 17 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 will be re-published in 2016. The Sub-committee has volunteers working on a small number of remaining issues. Revisions should be completed in advance of the Winter Meeting, with final approval of the chapter in Chicago. Submission is due in April 2015;
  - iv. Marilyn presented Eric with a paper plate "Up and at 'em" award as he is very highly thought of by ASHRAE's Handbook committee;
  - v. Al Veeck proposed and Mike Waring seconded the motion to approve the Handbook Sub-committee Report. The motion was carried by a vote of 10-0-0-7-18 (CNV).
  
- h. Publications Report .....Marilyn Listvan
  - i. Marilyn reminded attendees of the importance of publications: \$10M of ASHRAE's total annual income of \$26M comes from publications, including significant sales on Amazon;
  - ii. The IAQ Conference Proceedings CD is still in preparation;
  - iii. Marilyn reminded attendees that a bibliography of member publications is being added to the TC 2.4 website. Please send details to her. Note that People have the legal right to post their own publications on their own website (unless their employers own the copyright);
  - iv. ASHRAE is now placing emphasis on portable documents such as smartphone Apps. However, there are problems: the online Apps Store lists Apps that mention ASHRAE's name but were not created by ASHRAE; and the firm that developed ASHRAE's psychometric chart App (selling for \$6.99) has produced its own version which is selling for \$0.99. ASHRAE says that most members are interested mainly in Apps for time and money management;
  - v. The incoming Chair of ASHRAE's Publications Committee wants more reviewers to volunteer because, in addition to technical papers, review is needed of old and possibly outdated documents in the book store;
  - vi. Monroe Britt proposed and Al Veeck seconded the motion to approve the Publications Report. The motion was carried by a vote of 10-0-0-7-18 (CNV).
  
- 9. Reports from TC liaisons.
  - a. Barney Burroughs said that he had been asked by TG 2, HVAC Security, to act as their liaison to TC 2.3 and 2.4. They have made a request for help with the particulate-related sections of two of their documents: HVAC Applications Handbook Chapter 59; and Guideline 29. The TC agreed to help. The contact person is TG 2 Chair Anthony York. The Handbook Chapter is urgent as it will be published in 2015. If problems are encountered in viewing Guideline 29 on the ASHRAE website, contact Barney;
  - b. Barney said that TC 9.9, Data Centers, have noted corrosion issues from gases and reactive particles, and are preparing an RTAR that they would like the TC to review and co-sponsor;
  - c. Barney noted that ASHRAE's position paper on filtration and air-cleaning is undergoing final approval. Currently it has not been proved that air-cleaning directly benefits health, and there may be an opportunity for a research project here;
  - d. There were no other reports.
  
- 10. No items of Old Business were raised.
  
- 11. New Business
  - a. Eric Brodsky noted that the California Energy Commission is issuing regulations of interest to TC 2.4. Title 24 deals with energy-efficient buildings and comes into effect July 1, 2014. Title 20 is

- an appliance standard (including HVAC) and comes into effect in 2016. Title 20 states that air filters will need to be labeled with their MERV, rated air flow, rated resistance, and capacity measured by Standard 52.2 or AHRI 680. The CEC is soliciting input on Title 20;
- b. The Industrial Ventilation 2015 conference will take place in Shanghai October 26-28, 2015;
  - c. The YEA page for TC 2.4 has now been posted.
12. The motion to adjourn was proposed by Bob Burkhead, seconded by Gemma Kerr and carried unanimously. The Meeting was adjourned at 5:30 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 – Seattle* **Draft Minutes**

**Tuesday, July 1, 2014**  
**8:00 – 10:00 am**  
**Redwood A (Sheraton, Second Floor)**

### 1) Call to order, Welcome and Introductions

- a. Acting Chair Gemma Kerr called the meeting to order at 8:05 am and welcomed attendees. Everyone introduced themselves and a sign-up sheet was circulated. About 20 people were in attendance.

### 2) Review draft Agenda

- a. The Agenda was accepted without change.

### 3) Scope for the Planning Subcommittee

- a. *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) Committee Issues and Ideas

#### a. TC 2.4 Main Committee..... Tom Justice

- 1) Membership is the key to TC success. He is pleased to see more young people becoming active in the TC and the Research Subcommittee because there will be many retirements in the next couple of years. In connection with this, there were questions about TC involvement with Young Engineers of ASHRAE (YEA). Al Veeck attended the Seattle YEA mixer, and Tom organized an informal lunch on Sunday, though few YEA came. Greeters are at the door to the TC meeting to welcome new people. Ideas for other useful action included: providing info on air filtration since there are often no college courses; assigning mentors to interested YEA (**need action to recruit**); asking YEA to participate as greeters; focusing more on hot topics such as IEQ and sustainability.
- 2) Tom would like to see Vice Chairs in place on all Subcommittees.
- 3) As follow-up to a New York action item, Tom noted that ASHRAE recently introduced single-session registration that will allow members to attend program sessions sponsored by their TC. We should support this move. However, at \$70, the price is high and needs to come down.
- 4) ASHRAE is now supporting ISO standards. There is mixed support: while it is good to see ASHRAE documents go global, only large companies can afford to send representatives to international meetings.

5) a comment from the floor congratulated Tom on his program and meetings spread-sheet distributed in advance of the Seattle meeting.

**b.Planning.....Gemma Kerr**

Gemma noted that discussions at the New York Planning meeting had generated several action items, and that she would like to follow up on one not being addressed by other people. This was Eric Brodsky's complaint that another TC was talking about filtration in their Handbook Chapter without any reference to TC 2.4. Gemma said that this is actually a widespread problem occurring in research projects and ASHRAE publications as well as Handbook Chapters. It could be at least partly addressed by appointing liaisons to talk to other TCs and attend their meetings with offers of help (**need action to recruit liaisons**). Barney Burroughs said that the HVAC Security Task Group (TG 2) desperately needs help from both T 2.4 and 2.3 to update their Handbook Chapter and Guideline 29. Other committees likely needing a liaison include SSPC 62.2, TC 9.3 and TC 4.10.

**c.Handbook .....Eric Brodsky**

Work on the TC's handbook chapter (HVAC Systems and Equipment, Chapter 29, *Air cleaners for particulate contaminants*) is going well, and no issues were reported.

**d.Program.....Marilyn Listvan**

- 1) The TC had only one program approved for this meeting, a seminar on IAQP (it was cancelled due to speaker unavailability but hopefully will run in Chicago). The workshop on filters in 2035 was rejected with no reason given. Lack of submissions success and feedback on rejections continue to be problems.
- 2) Marilyn proposed that the TC book the 1-hour slot that we used to use for the TC 2.3/2.4 Publications Subcommittee meeting, and use the time to run a Forum or Workshop. ASHRAE will include such programs in their Technical Sessions book

**e.Publications.....Marilyn Listvan**

- 1) Publications are very important to ASHRAE, representing more than a third of their annual income.
- 2) As follow-up to a New York action item, Marilyn reported that ASHRAE is interested in developing smart phone Apps for member use and estimates 38 weeks development time. A search of the Apps Store revealed 26 "ASHRAE" apps, notably one on the psychrometric chart, but most were not created by ASHRAE. Attendees were in favor of TC 2.4 developing an App, and referred the issue to the TC for further discussion.
- 3) The TC 2.4 material we submitted was included in the slideshow presentation for YEA.
- 4) ASHRAE is looking for manuscript reviewers. Brian Krafthefer said that he had volunteered but had got no response.
- 5) Marilyn asked attendees to send her their bibliographies of material on particulates and filters for posting on the website.

**f.Research.....Michael Waring**

- 1) The Research Subcommittee meeting went well with a good number of people volunteering to help write RTARs. Two RTARs have been submitted, but they are slow to produce. He will communicate more with the writers in the hope of improving this situation.
- 2) A good goal would be to always have one funded project in progress.

**g.Standards.....Mike Corbat**

There was no report as Mike Corbat had been unable to attend in Seattle. Chair Gemma Kerr

used the slot for more discussion on the issue of ASHRAE and ISO standards. Al Veeck was against ASHRAE standards being replaced by ISO on several grounds: one HVAC&R shoe does not fit everyone and we should retain what suits the country best; the US will lose control of its standards as it only has one vote on the ISO committee; ASHRAE will lose valuable income if it is selling ISO Standards and not its own. Zied Driss noted that although the US is dominant in research in particulate filters, it is good to involve other countries – the more people, the more ideas. The discussion made it clear that this is a complex issue that needs further consideration.

**h. Website.....Al Veeck**

The TC website is hosted by the National Air Filtration Association, and its address is [www.nafa.hq.org](http://www.nafa.hq.org). Al summarized the layout, some of it new: all advertising has been removed; a link to ISO TC 142 has been created; Subcommittee reports are shown separately from the Minutes package (this will be changed to avoid duplication; research projects are listed; the Chair email alias is posted. Tom Justice noted that he did not use the alias. It was suggested that there should be a new tab related to research and titled “Getting started with ASHRAE research”, and that it should show examples of approved RTARs and Work Statements.

**i. Membership..... Al Veeck**

In response to a question, Al explained the process for becoming a corresponding member (CM) of the TC. Voting members are typically selected from the pool of CM who are active in the Subcommittees.

**5)New Business**

Brian Krafthefer noted that TC 2.3 is developing a “road map” to help it move forward. He suggested that TC 2.4 consider doing the same. After some discussion it was agreed to go ahead.

**Action item: Brian, Tom Justice, Gemma Kerr, and Barney Burroughs will work to prepare a draft road map for discussion in Chicago.**

**6)Adjourn**

The meeting was adjourned at 9:57 am.

## ATTACHMENT #3

**ASHRAE RESEARCH SUBCOMMITTEE MEETING MINUTES**  
**Seattle, Washington**  
**TC2.4 – Particulate Air Contaminants/Removal Equipment**

Sunday, June 30, 2014  
3:00 – 5:00 PM  
Location: Grand Ballroom B

1. Call to Order, *the meeting began at 3:05 PM, Michael Waring chaired*
2. Introductions, *38 people were present according to the sign in sheet.*

*Harvey Sachs, the TC 2.4 RAC liaison, was present and discussed: (i) the new RTAR format designed to reduce barrier to writing; and (ii) that ASHRAE adopted a new strategic plan that emphasizes research that crosses component levels to address system level issues (i.e., RPs broadly supported across multiple committees are more likely to be supported).*

3. Review of Agenda, *M Waring reviewed the agenda*
4. Chair's Comments, *M Waring wants the TC to have a goal of always having at least one funded research project.*
5. Work Statement activity between meetings

- a. 1649-WS Impact of Higher Efficiency Filtration on IAQ in Residential Environments with Central HVAC – Champion: Tom Justice

*This WS came back twice from RAC (new set of questions the second time). Brian Krafthefer is going to take it up and try to work on altering the writing a bit. This WS has three people working on it; goal is to submit by next deadline.*

*Thad Ptak suggested changing title from 'IAQ' to focus on 'particles' (generally agreement in the room).*

6. RTAR activity between meetings
  - b. RTAR-1734, Reproducing the Typical Urban Atmospheric Aerosol in Laboratory for Air Filter Loading – Champions: Paolo Tronville and Geoff Crosby, Cosponsored by SSPC 52.2
- c. RTAR 1735, Evaluating effectiveness and costs of room air cleaners and central HVAC filtration for controlling particulate matter in residences – Champion: Brent Stephens

*This RTAR was returned with comments, but these were not available at this time.*

7. Current Research Project
  - a.RP-1691 Modeling the impact of residential HVAC filtration on indoor particles of outdoor origin. *(RAC voted to approve last meeting; PI Brent Stephens submitted his progress report on June*

*10 for the period covering April 1 to June 10. The PMS met directly before this meeting. Brent Stephens gave a quick 5-min update.*

- i. Report from the PMS

*Bruce McDonald (chair of PMS) said he has great confidence that results will be useful, and also to 62.2. There was broad interest in the huge gulf between different filters with same MERV numbers for ultrafine particles. Vijay has some submicron particle data on microfiche. He's going to send it to Brent Stephens.*

8. Cosponsored Projects (for reference only)

- a. RP-1603 Role of HVAC Systems in the Transmission of Agents in Buildings and Intermodal Transportation (TC2.4 co-sponsor with TC9.6 and EHC. TC 9.3 main committee) *This is a current research project w/ Shelley Miller from CU Boulder. As of last meeting: "Paolo Tronville and Bob Baker are part of the PMS/PMC, and project started last summer and has produced the literature review, which the PMC will vote on acceptance. Unsure about how they will progress with field measurements."*

*No update on this project at this time.*

- b. TC 2.1 – 1624-TRP Effective Energy Efficient School Classroom Ventilation (*Bid won by DANISH TECHNOLOGICAL INST. - Aarhus, Denmark*)

*This project was recently awarded. No update at this time.*

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

- a. 1649-WS Impact of Higher Efficiency Filtration on IAQ in Residential Environments with Central HVAC – Champion: Tom Justice

*See number 5 above.*

- b. 1626-RTAR Energy Implications of Air Filtration in Commercial Buildings

*Chair emailed Phil Winters, previous RTAR champion about assigning a new champion. Jeff Siegel discussed that Harvey Sachs is an advocate for this project and it was suggested that we resubmit.*

*New champion: Dara Feddersen.*

*Help from: Jeff Siegel, Brent Stephens, Zied Driss, Michael Sexsmith, John Horns*

- c. Impact on performance (efficiency and pressure drop) of air filters in high humidity and free moisture conditions. Champions: Dave Matier and Christine Stanfel

*Original champions, Dave Matier and Christine Stanfel, could not move this forward anytime soon, so last meeting Bob Burkhead was assigned as the new champion for writing the RTAR. Bob is committed to having it submitted by Chicago 2015 meeting.*

*Interest/help from: Paul Bryant, Michael Sexsmith*

- d. Discussion of new RTAR ideas

i) Filtration of viruses for different MERV classified filters (*Champion: Al Vatine*)

*Al Vatine said he is interested in real world, in-situ testing.*

*Jeff Siegel said there are University of Minnesota methods that can be used, and he thinks it is a great idea.*

*Brent Stephens said to be careful to mimic real expelled aerosols accurately and that there might be some overlap with Sloan Foundation work; also that there might be moisture conditions to explore because of evaporation/inactivity. He also asked about overlap with RP-1603, which the RTAR authors will check on.*

*Al Vatine will champion; Brent Stephens can help.*

ii) Particle filtration for residential mechanical ventilation systems

*It was decided to either roll this into the next RTAR idea ('Particle filtration by building envelopes') or into WS 1649.*

iii) Particle filtration by building envelopes

*Vijay wanted to define the scope very clearly and likes the idea.*

*Thad Ptak is not sure it is relevant to 2.4, though M Waring pointed out that 2.4's purview covers anything to do with indoor PM concentrations.*

*Discussion about adding in energy implications (likely modeling and not long-term energy measurements) as well. Vijay and Thad didn't want energy modeling, but we also discussed leaving it up to the proposers to handle the methodology.*

*Check about participation with TC 4.3 or 4.4.*

*Champions: Brent Stephens and Vijay*

iv) RTAR on Round Robin with current 52.2

*Voted to cosponsor this 'in spirit' at the last main TC 2.4 meeting.*

*4 addenda are being approved around this time, and there will be new Round Robin testing when these take effect.*

v) MERV levels used in health care – tradeoffs between high air exchange rates and higher efficiency filters.

*Phil Maybee and Zied Driss agreed to 'take a look at the RTAR' last time. No progress.*

vi) Other ideas?

Idea: Embedded sensors in filters.

*Tom Justice reported that Brian Krafthefer is interested in sensors and nanotechnology embedded in filters. Maybe micro-bio sensors? He will have a write-up for the next meeting.*

Idea: Low-cost PM sensors for use in HVAC related decisions.

*Discussion about whether to develop a sensor or characterize what's on the market; there general opinion against development. There was a lot of interest in "an evaluation of currently available inexpensive particulate matter sensors."*

*Thad Ptak discussed that finding sensors isn't probably the issue; it is applying them and validating their use in buildings with "intelligent ventilation and filtration."*

*Suggestion to partner with TC 7.5 Smart Building Systems.*

*M Waring suggested a 2 part RTAR: (1) sensor review (survey and characterization), and (2) demonstration of the use of the 'winning' low-cost PM sensors.*

*Champions (no lead at this point): Vijay, Rahul Bharadwaj, Brent Stephens, Michael Waring, Michael Sexsmith, Dave Chojnowski*

Idea: Particle deposition in buildings

*Vijay thinks it was way too broad (issues with the type of particle).*

*TC thought probably better folded into the envelope penetration study as well.*

#### 10. Liaison Report

*Vijay suggested we often have US focus but we maintain an international following and we should keep that in mind.*

*Brent Stephens discussed the 62.2 ongoing filtration data needs and interest in outdoor air treatment. No action needed but may be a way to combine forces on an RTAR.*

#### 11. Adjournment, *meeting was adjourned at 4:55 PM*

## ATTACHMENT #4

### MEETING MINUTES TC 2.4 STANDARDS SUBCOMMITTEE

Monday, 30 June 2014  
Redwood B (2, Sheraton) Seattle, WA  
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** – Bob Burkhead.
  - i) 4 addenda: 2 have been finished and, of the other 2, one has negative comments.
  - ii) There was an interpretation request and a response will be sent out for an email ballot and should be ready by Chicago. The biggest RTAR is the round robin for testing 52.2 (w/ new addenda) and currently looking for champions.
  - iii) Appendix J discussions are currently postponed for next meeting as we do not have enough agreement on the topic. No vote taken.
  - iv) RTARs are just getting off ground.
  - v) Michael Corbat will be taking over as committee chairman at next meeting.
  - vi) 2017 is target timeframe for republication of the standard which will a big part of the upcoming meetings under Michael's leadership.
- b) **GPC 35 - Method for Determining the Energy Consumption Caused By Air-Cleaning and Filtration Devices** – Geoff Crosby
  - i) Brad Stanley led the meeting on behalf of Geoff Crosby. There was not a quorum. Discussion on the rating system, and they are trying to schedule an interim meeting before the winter meeting sometime in fall.
  - ii) RTAR 1734 received by RAC and is being currently voted on.

#### 2) ASHRAE Liaisons:

- a) **TC 2.3 – Gaseous Filtration** – Kathleen Owen
  - i) **SSPC 145.1 Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Media)**
  - ii) **SSPC145. 2, Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Filter)**
    - (1) Matt Middlebrooks chaired the 2.3. There were minor changes to 145.2 - two of the addenda, A and B
    - (2) A: same chemical got listed twice and two different conc.
    - (3) There was an addendum on: For very poor performing filter which would not have to do the full 4 hour test. That is also done with the review.
    - (4) Brad Stanley presented a report on duct size versus the sample size. So it would be a standard for 24x24 size filters to reduce variability but the variable size of the duct will be allowed at this time.
- b) **TC 2.9 – UV Air & Surface Treatment** – Matt Middlebrooks
  - i) **SPC 185.1P Elimination of Microbial Contaminants in Air**
  - ii) **185.2 Elimination of Microbial Contaminants on surface**
    - (1) SPC 189.1 and 2 killing things on the fly and 2 is UV. Both have been completed. Looking for a guideline, then a standard. And they want to do a GPC on upper air UV, lights above eye level. Both will be out for public review soon.
- c) **TC 5.4 – Industrial Air Cleaning** – Bruce McDonald
  - i) **SPC 199 – MOT for Rating the Performance of Industrial Pulse Cleaned Dust Collectors**
    - (1) Committee was very hopeful at some point to finish this, but we didn't quite finish it Friday and Sunday. Hopefully, in a few internet meetings this will be accomplished and ready for the Chicago meeting.
- d) **TC 9.6 – Health Care Facilities** – Zied Driss
  - i) They met yesterday (6/29); around 32 people attended; nothing to report.
- e) **SSPC 62.1 – Commercial Ventilation** – Charlie Seyffer

- i) New addenda for IAQ voted, approved.
  
  - f) **SSPC 62.2 – Residential Ventilation – Brent Stephens**
    - i) Brent was not able to go and had circulated a report from filtration task group. They do not have a specific proposal yet. They have some specific issue such as a ventilation rate, and there are a lot of assumptions. They have proposals on how to evaluate mechanical air filtration.
    - ii) And also bringing in outside air and they have never done that and they may have to start a separate group for that.
    - iii) There is some interest in increasing the minimum MERV levels; they need inputs for those assumptions.
    - iv) What is ASHRAE's position to tackle places where the PM 2.5 level is too high?
    - v) The initial thought process is to follow 62.2
  - g) **SSPC 90.1 Energy Eff. Design of New Bldg – Christine Sun**
    - i) No report, Christine had to leave early. Contact Christine later.
  - h) **SSPC 90.2 Energy Eff. Design of New Low Rise Res. Bldg –**
    - i) No Liaison for this meeting. It is 2:15pm Monday meeting.
  - i) **SSPC 161 – Air Quality in Commercial Aircraft – David Matier**
    - i) This meeting coincided with GPC 35 and Dave could not go to the meeting.
  - j) **SSPC 170 – Ventilation of Healthcare Facilities – Zied Driss**
    - i) They are meeting tomorrow and Zied is looking for members who can attend as he has not been able to go to those meetings.
    - ii) One of the tasks was to provide the justification of why a MERV 8 used. There is a serious down grade in filtration which was not backed up by scientific data. They are trying to commoditize filters and they consider filters just as pressure drop during operation. They can save more if they carry less number of products.
  - k) **SPC 180 – Inspection & Maintenance of HVAC Systems – Phil Maybe**
    - i) No updates. Did not meet.
  - l) **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) No updates. Nothing going on that impacts TC 2.4.
  - m) **SPC 189.2 Design, Construction and Operation of High-Performance Green Healthcare Facilities (?inclusion of IAQ) –**
    - i) Nobody from TC 2.4 attending. May need to be advised if they call for decreased efficiency filtration as called out in the Handbook.
  - n) **US TAG for ISO TC142 – Don Thornburg**
    - i) Don is the current chair. Primary interest is general ventilation.
    - ii) 16890-3,4 gravimetric. Has been emailed for comments
    - iii) 16890 -2 will go out for comments
    - iv) In general, going through a sloppy transition to the next officers. When Don rolls off we do not have officers along with the expert panels and the advisory panels for the next meeting in Chicago.
  - o) **GPC 23 Guideline for the Design/Application of HVAC Equip. for Rail Passenger Vehicles – Tom Justice**
    - i) Cognizant 9.3: GPC 23 covers HVAC for rail passengers and there is conflict for this meeting tomorrow morning at 8 am. John volunteered to attend that meeting.
    - ii) GPC 23 was out for public review, comments – closed on 6/30/14. Reviewing comments during the meeting.
  - p) **Environmental Health Committee – Barney Burroughs**
    - i) No comments. This was an addition that Barney suggested to be added to the list. Meeting on Monday morning.
    - ii) Position paper on air filtration and health and the document should be out after the summer meeting. Their interest is impact on health as there is very little knowledge in that area. It's a good committee to track.
- 3) **Old Business**
- a) **Report of Working Group Regarding: Proposal for new standard regarding residential filter test method – Tom Justice, Chair**
    - i) Communicated with Stephanie and she has sent a form to start a new committee. It would need blessing of TC 2.4 and SSPC 52.2.

- ii) Tom has sent a letter to GPC (SSPC 62.2) and hasn't received any response.
- iii) Next step is to finish the paperwork and send to the standards.
- iv) They were really excited to see Bruce's presentation on PM 2.5 but there was no response from them later.
- v) This will be brought to TC 2.4 next meeting.

4) **New Business**

- i) California energy commission: Trying to push through requirement for residential filter to be marked with initial resistance and efficiency. Every unit should be marked with a sticker that this unit can or cannot handle a certain type of filter. California title 24 (needs to be googled) - this goes in effect July 1<sup>st</sup>.
- ii) The directions are vague as they say you can do 52.2 or AHRI 680 test - tests do not correlate with each other.

5) **Information Exchange:**

a) **AFS – KJ Choi**

- i) 2014 Next Generation Filter Media Conference, Embracing Future Challenges will take place October 14 – 15 at the Hilton Rosemont Hotel at Chicago's O'Hare airport. Abstract submission and registration opened May 20.

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

- i) Nothing to report

c) **Eurovent – Paolo Tronville**

- i) Nothing to report

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

e) **INDA – International Nonwovens Development Association – 18<sup>th</sup> 19<sup>th</sup> 20<sup>th</sup> in Baltimore.**

- i) Filter media course (discounted, typically costs ~\$5000) Tuesday and Wednesday and keynote speaker from Harvard University (Spangler). Exhibitor space is around 85 % full so it may be the biggest show so far.

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

Reference	Document title
ISO/CD 12249-1	Particulate air filters for general ventilation -- Part 1: Method of calculation for the life cycle cost for air cleaning devices
ISO/AWI 14086-1	Flat sheet filter media -- Part 1: Fractional efficiency test for general ventilation applications
ISO/DIS 15858	UV-C Devices -- Safety information -- Permissible human exposure
ISO/DIS 15957	Test dusts for evaluating air cleaning equipment
ISO/DIS 16170	In situ test methods for very high efficiency filter systems in industrial facilities
ISO/CD 16890-1	Air filters for general ventilation -- Part 1: Technical specifications, requirements and efficiency classification system based upon Particulate Matter (PM)
ISO/CD 16890-2	Air filters for general ventilation -- Part 2: Measurement of fractional efficiency and air flow resistance
ISO/CD 16890-3	Air filters for general ventilation -- Part 3: Determination of the gravimetric efficiency and the air flow resistance versus the mass of test dust captured
ISO/CD 16890-4	Air filters for general ventilation -- Part 4: Conditioning method to determine the minimum fractional test efficiency
ISO/DIS 16891	Test methods for evaluating degradation of properties of cleanable filter media
ISO/AWI 29464	Cleaning equipment for air and other gases -- Terminology

**g) NAFA – A. Veeck**

i) The Annual Meeting of NAFA will be at the St. Regis Hotel in Aspen, Colorado on September 24-26, 2014. Featured presenters on the agenda will be Bill Fisk of UC Berkeley, G. Kent Mangelson of the American Society for Asset Protection, Jack Malcom of Falcon Professional Group, Shawn Dyer of GTS Transportation Services, Dr. Bob Scheir of SterileAire, Dr. Til Schreiber of the College of William & Mary, Lisa Gravnak of Vargo & Associates, and Dr. Brent Stephens of IIT. Also on the program will be presentations to Members receiving the Distinguished Service, Hall of Fame and Lifetime Achievement awards.

**h) SAE Air Cleaner Test Code Standards Comm. – B. McDonald**

i) The one US standard that they are working on is the water removal standard.  
 ii) ISO 12103 Part 1 about the test dust that is being republished - the dust will be the same but the testing method is changing. Soot may be used as the loading dust or salt.

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

i) Nothing to report

**j) UL 900 – R. Haseman**

i) Nothing new - the Class 1 and 2 have been dropped. Other than that nothing changed.

**k) IAQ Meetings – J. Siegel**

i) Indoor air 2014 a big conference in Hong Kong.

**l) Filtech Show – February 2015 in Cologne, Germany. Great show to track.**

**6) Adjourn – 6:00 pm**

Attendees			
#	Name	Affiliation	Email
1	John Simenson (Vice Chair)	Johns Manville	
2	Rahul Bharadwaj	AAF International	
3	Zied Driss	Camfil	
4	Michael Waring	Drexel University	
5	Brent Stephens	IIT	
6	Len Duello	Georgia-Pacific	
7	Al Veeck	NAFA	
8	Tom Justice	Zene	
9	Tim Ahn	Clean & Science	
10	Jinsuk Lee	Clean & Science	
11	Michael Sexsmith	Ahlstrom	
12	Matt Ball	Koch Filter	
13	Sanjeev K. Hingorani	Lennox Ind.	
14	John Horns	3M Company	
15	Matt Middlebrooks	FGL	
16	Bob Burkhead	Blue Heaven	
17	Monroe A. Britt	Green Leaf	
18	Mark P. Anttila	Eastman Chemical	
19	Joel Davis	Flanders Filters	
20	David Christopher	HDK Industries	
21	Todd McGrath	Glasfloss	
22	Chris Peart	HDK	
23	Thad Ptak	Columbus Industries	
24	Tim Johnson	TSI	
25	David Matier	Freudenberg	
26	Kartik Potukuchi	Graver Technologies	
27	Kyung-Ju Choi	Clean & Science	
28	Bruce McDonald		
29	Jean Girard	Texel	

**ATTACHMENT #5**

## TC 2.4 Program Subcommittee Meeting – Seattle, WA

1-Jul-2014 Tuesday 10:00 – 11:00 (Redwood A, Sheraton 2)

17 people attended; 1 of 5 proposed programs (2 were submitted) were accepted for Seattle -- *accepted one was withdrawn*

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

The Conference's Technical Program itself **is going big with a focus on big projects, the big picture and big impacts.** \*\*\*\*\* Tracks \*\*\*\*\*

**Track 1: Systems and Equipment** The proper selection of HVAC for a job is critical. This track covers considerations for a proper functioning system.

**Track 2: Fundamentals and Applications** Basic HVAC principles are key in any project. Knowing what they are helps to apply in specific projects. This track covers a broad array of pertinent information.

**Track 3: Industrial Facilities** Manufacturing and processes can have some different requirements for HVAC. This track explores design and practices for industrial buildings.

**Track 4: Large Buildings: Mission Critical Facilities and Applications** Facilities like data centers have some different characteristics.

**Track 5: Energy Efficiency** Energy efficiency is on everyone's mind as energy costs continue to rise. This track will cover an array of considerations to help drive towards net zero energy.

**Track 6: Life Safety** This encompasses egress, sprinklers, alarms, emergency lighting, smoke barriers, and special hazard protection.

**Track 7: Design of Energy and Water efficient Systems** The trend is to green sustainable buildings. This track will look at what works and what doesn't to attain these efficient systems.

**Track 8: Hospital Design and Codes** Healthcare design takes into account some unique aspects. This track explores design and code requirements to ensure patient comfort.

>>>>

**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.:

Chicago  
 seminar & forum  
 & Workshop  
 proposals  
 (abstracts)  
 deadline =  
**August  
 11th**

**Workshops need  
 Learning  
 OBJECTIVES written  
 (Includes Bio,  
 Learning Objectives  
 and Methods of  
 Assessment).**

Proposed for Future CHICAGO =

Jan 24-28, 2015

Type	Title	CoSponsor	Chair
------	-------	-----------	-------

<b>Workshop, resubmit</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 (KJ Choi, Behnam)
<b>Seminar, resubmit</b>	The IAQ Procedure is Alive & Well: Updates related to std 62.1, TRG4.IAQP & LEED v4.0	2.3, 2.4 EHC(?), TRG4.1(?), IAQP(?)	Chris Muller (Charlene Bayer, Charlie Seyffer, Dennis Stenke, Scott Williams, Pawel Wargocki(?))
<b>Workshop</b>	Performance of Filtration Test Standards (EN779 vs. 52.2 vs ISO)	2.3, 2.4	<u>Paolo</u> <u>Tronville(?)</u> , Al Veeck, Tom Justice's speaker
<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)	<b>2.5, EHC?</b>	Marilyn Listvan
<b>Forum Monday 3-4pm</b>	Do we Need a Separate Test Standard for Residential Filters?	2.3?	Tom Justice

Proposed for Future Atlanta =

June , 2015

Type	Title	CoSponsor	Chair
<b>Tech paper(s)</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 (Intl)
<b>Symposium</b>	<b>Filtration for Hospitals</b> (from NY seminar speakers)		Zied Driss

<b>Workshop</b>	How can Filters be rated by their PM ( PM1, PM 2.5, PM 10, etc.) performance?	52.2 ?	Don Thornburg (Bruce McDonald &?)

Al Veeck Tim Johnson Brian Krafthefer Kyung-Ju (K J) Choi Gemma Kerr Sanjeev Hingorani Zied Driss Tom Justice Joel Davis Mark Anttila Monroe Britt John Zhang John Simonson Tim Ahn Dara Feddersen Marilyn Listvan	SubComm co-chair SubComm chair
---	-----------------------------------

## ATTACHMENT #6

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

#### Handbook Subcommittee Meeting

**Sat. June 28, 2014 1:00 – 2:30**

1. Call to order 1:00 PM Eric Brodsky, Chair
2. Introductions
3. Attendees: Pat Marks, Michael Sexsmith, Gemma Kerr, Brian Krafthefer, John Simenson, Phil Maybee, Bob Burkhead, Tim Johnson, Tom Justice, Len Duello, Eric Brodsky, Zied Driss, Dara Fedderson, Mike Flom, John Zhang, Matt Ball, Keith Chesson, Thad Ptak, Dale Montgomery

#### 4. Session Notes

Chapter 29 was published in 2012 and updates for 2016 need to be complete and submitted to ASHRAE by April 18, 2015.

We conducted a working session and reviewed the document for updates. About 4 areas remaining areas have been identified to be updated by specific volunteers.

#### 5. Next Steps

E. Brodsky will distribute the most recent chapter with meeting updates. Reviewers will update respective areas and return in 6 weeks. The updated handbook will be redistributed for final review 4 weeks prior to the Chicago meeting. The plan is to be ready for a TC 2.4 vote at the January 2015 meeting.

#### 6. Other Business- none

Meeting adjourned -2:00

Prepared by Eric Brodsky,

Draft Minutes submitted: 6/30/2014

[justfilter@yahoo.com](mailto:justfilter@yahoo.com), [gkashrae@magma.ca](mailto:gkashrae@magma.ca) , [patrick.c.marks@jci.com](mailto:patrick.c.marks@jci.com)