

Draft Minutes
TC 2.4 Particulate Contaminants/Removal Equipment
Main Committee Meeting
Orlando, Tuesday January 26, 2016
3:30-6:00 pm
Orange F, Lower Lobby, Orlando Hilton

All Votes are Italicized

All Action Items are Bold and Italicized

1. Call to order..... Gemma Kerr
2. Introductions
3. Roll call Michael Corbat
 - a. 14 present, 3 absent 17 total

Voting Member	Position	Present	Absent	Voting Member	Position	Present	Absent
Gemma Kerr	Chair	X		Brian Krafthefer		X	
Bob Burkhead	Webmaster	X		Bruce McDonald			X
Geoff Crosby		X		Kathleen Owen		X	
Todd McGrath		X		John Simenson	Std. Sub.	X	
Michael Sexsmith		X		Brent Stephens		X	
John Zhang			X	Mike Waring			X
Eric Brodsky	Handbook	X		Keith Chesson		X	
Randy Haseman		X		Paolo Tronville		X	
Tim Johnson		X		Total		14	3
				Total Members			17

Non-Voting
Officers

Don Thornburg	Vice Chair
Marilyn Listvan	Program & Publication
Zied Driss	Research Vice Chair
Dara Feddersen	Program Vice Chair
Donna Sullivan	Program Vice Chair
Anja Coenen	Standards Vice Chari
Jenni Wong	Membership Vice Chair

Total Attendance: 14 Voting Members, 24 Corresponding Members, 15 Guests Present:
 Total= 53, 1 Liaison – Pawel Wargocki (RAC)

4. Welcome and opening comments Gemma Kerr
 - a. Review of ASHRAE Code Of Ethics (See Addendum A)
 - b. 8 YEA members in attendance
 - c. TC Chairs breakfast
 - i. Feb. 8 deadline for program submission
 - ii. 2 MTG's of interest that should be followed up on. MTG.IAST,
 - iii. ASHRAE has revamped website structure. Meant to be easier to use. TC does not currently post to ASHRAE, but to NAFA instead because of Particle Party pictures (space)

5. Particle Party..... Keith Chesson
6. Approval of Atlanta Minutes..... Michael Corbat
 - a. *John Simenson motioned to accept. Randy Haseman second. 13-0-1-3-17*
7. Record of votes taken since Atlanta Michael Corbat
 - a. The TC has voted in favor of co-sponsoring the RTAR “**Repeatability and reproducibility assessment of ASHRAE Standard 52.2 as currently amended**”. The vote details were 15-0-2-0-17 (For-Against-Abstain-Not responding-Total VM). The abstainers were a potential project bidder and the TC Chair (CNV). Voting was completed August 3, 2015.
8. Subcommittee Reports
 - a. Planning Subcommittee Report..... Don Thornburg
 - i. Provided by Gemma Kerr
 - ii. Purpose of procedure of the TC is evaluated and updated as needed
 - iii. Programs were a point as TC does not often get any accepted.
Have attempted to use publications time slot to run our own program but it has not worked in 2 attempts.
 - iv. All 8 FAQs that TC is responsible for were discussed with. 7 had minor changes. 8th to go to letter ballot after Gemma reviews
 1. *Tim Johnson moved to accept 7 with minor changes. Geoff Crosby second. 10-0-3-4-17*
 - v. Gemma called to have assistant in logo and welcome pamphlet.
 - vi. Gemma to formally request official liaison from IAQA which is now formally part of ASHRAE although meeting separately temporarily.
 - vii. Need to review the roadmap and how TC 2.4 supports ISO TC 142
 - viii. *Motion to Approve Report. K. Chesson. 2nd P. Tronville – 13-0-1-3-17 CNV*
 - ix. Full report in Addendum B
 - b. Membership Subcommittee Report..... Tom Justice
 - i. Jenni Wong reporting
 - ii. Current roster has 17 voting members
 - iii. 3 members will be rolling off after the Summer meeting (Saint Louis)
 1. Randy Haseman, Tim Johnson, Paolo Tronville
 - iv. New chair has decided to increase our roster level so we will be turning in names for 4 new voting members to bring the roster up to 18
 - v. 1 major change to current roster. Mike Corbat will be filling in as Secretary.
 - vi. Executive Committee for 2016/2017 to be turned in tonight to TAC for approval
 1. Gemma Kerr – Chair
 2. Mike Corbat – Vice Chair
 3. Zied Driess – Secretary
 4. Membership Subcommittee
 - a. Jeni Wong – Chair
 - b. Tom Justice – Vice Chair

5. Research Subcommittee
 - a. Brent Stephens – Chair
 - b. Rahul Bharadwaj – Vice Chair
6. Standards Subcommittee
 - a. John Simenson – Chair
 - b. Anja Coenen – Vice Chair
7. Handbook Subcommittee
 - a. Erik Brodsky- remain as Chair
 - b. Vice Chair to be confirmed
8. Program Subcommittee
 - a. Dara Federsen and Donna Sullivan – Co-chairs
 - b. Marilyn Listvan – Vice Chair
- vii. *Motion to Approve Report M. Sexsmith. B. Krafthefer. 13-0-1-3-17*
CNV
- c. Research Subcommittee Report..... Michael Waring
 - i. Brent Stephens reporting
 - ii. 46 people attended
 - iii. ASHRAE has quite a bit of extra money in reserve that could be spent on research. \$3 million extra
 - iv. Grant submissions moved to May due to workload for RAC
 - v. Updated guidelines for PMS
 - vi. Requesting co-authorship with other TCs. Concerns were raised due to silo nature of TC Research meetings.
 - vii. RTAR and WS due May, August and December 15. Be MAD at RAC
 - viii. TRP-1649 PES and RAC have reviewed proposals and made recommendations. Will assign to 1 of 6 proposals. Cannot discuss winner or others who submitted.
 1. *Vote to approve PES recommendation motion G. Crosby. 2nd T. McGrath 11-0-1-5-17 (B. Burkhead abstained due to lack of information)*
 - ix. WS1734 – cosponsored with 52.2. Revised to less cost and scope. Will be resubmitted in May deadline. (Mike to get new title). Renamed to eliminate confusion with ASHRAE dust. Also 2nd laboratory validation phase has been removed which has reduced budget to \$185k. Below \$200k keeps away from board of directors.
 1. New Name: “Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing to be Used in ASHRAE GPC 35P for Determining the Energy Consumption Caused by Air Filters”
 2. *Vote to approve changes and resubmit motioned by B. Krafthefer. 2nd B. Burkhead. 14-0-0-3-17*
 - x. 2 RTARs have been accepted and moved to WS. RTAR-1756 (B. Stephens) and RTAR-1784 (A. Coenen). Both are aiming for submission as WS by May deadline.
 - xi. RTAR 1726 was submitted to RAC. Needs to be retooled and need cosponsorship.

- xii. 4 in process RTARs.
- xiii. *Motion to Approve Report P. Tronville. 2nd M. Sexsmith – 12-0-2-3-17 CNV*
- xiv. Full Report in Addendum C
- xv. ***Gemma to write letter to RAC over frustration of no information allowed out regarding approval of PES decision when awarding projects.***
- d. Standards Subcommittee Report..... John Simenson
 - i. 38 people in attendance
 - ii. SSPC 52.2
 - 1. 3 addenda out for publication
 - 2. Intend to republish 2016
 - 3. Presentation on 16890
 - 4. Presentation on conceptual 52.3
 - 5. RTAR 1784 moving to WS
 - iii. GPC 35
 - 1. WS 1734 in progress
 - 2. Group moving forward with procedural while awaiting 1734
 - iv. US TAG
 - 1. WG3 – 16890. All 4 parts are in FDIS and will go out to vote as standard soon. Should be full standard by end of year. CEN will change.
 - v. UL 900 – testing ongoing to confirm repeatability of test
 - vi. AHRI 680 – going to be updated to include PM 2.5. Will be added to standard update in meeting.
 - vii. *Motion to approve report M. Sexsmith. 2nd T. Johnson 12-0-2-3-17 (CNV, Subcommittee chair NV)*
 - viii. Full Report in Addendum D
 - ix. MTG.IAST – Energy impact of... – Volunteers G. Crosby primary. B. Krafthefer alternate. *Motion liaisons to approve P. Tronville. 2nd M. Sexsmith. 11-0-3-3-17 (CNV. 2 liaisons not voting)*
 - x. MTG – Cold Climate design guide – already published so not pursuing now.
 - xi. MTG – Hot Dry climate design – no volunteers. Meets Sun. 8-9.
- e. Program Subcommittee Report..... Marilyn Listvan
 - i. Tom Keuhn heading program meeting for St. Louis
 - ii. Did not get to use publications time slot for presentation as requested
 - iii. 21 people in attendance
 - iv. 2 conference papers accepted this time
 - v. Conference papers are 90% approval. Tech papers near 100%. Forums and workshops much lower approval.
 - vi. *Motion to approve report B. Burkhead. 2nd P. Tronville. 13-0-1-3-17 (CNV)*
 - vii. Full slate of recommendations in addendum E
- f. Publications Subcommittee Report..... Marilyn Listvan

- i. Please send Marilyn articles and presentations to be added to bibliography for reference materials.
 - ii. Publications gave up meeting time for presentations. It is joint with TC 2.3
 - iii. *Motion to approve report R. Haseman. 2nd K. Chesson 13-0-1-3 (CNV)*
 - g. Web Master..... Bob Burkhead
 - i. Complaint from outside that website allows access to research papers to be downloaded without payment or being a member.
 - ii. NAFA is willing to give up hosting website if TC wants to move back to ASHRAE hosted.
 - iii. *Motion to move from NAFA to ASHRAE M. Sexsmith. 2nd G. Crosby 13-0-1-3-17 (CNV)*
 - iv. *Motion to approve report R. Hasemen. 2nd T. Johnson 13-0-1-3-17 (CNV)*
 - h. Handbook..... Eric Brodsky
 - i. Proofs are ASHRAE for approval. No meeting.
 - ii. *Motion to approval report B. Krafthefer. 2nd J. Simenson. 12-0-1-4-17 (CNV)*
- 9. Reports from other TC liaisons
 - a. Pawel Wargocki from RAC –
 - i. No nominees for graduate students for awards that participated in research projects. Nominees due 12/15/16.
 - ii. \$10,000 scholarship to students. Nomination moved to February 2017.
 - iii. Residential environments is primary focus of research.
 - iv. URP (Unsolicited Research Project) evaluation has been more developed and will be implemented
- 10. Old Business
- 11. New Business
 - a. Michael Waring is chairing next Indoor Air Conference in 2018 at Drexel. Congratulations
- 12. Adjournment
 - a. *Motion to adjourn M. Sexsmith. 2nd K. Chesson*
 - b. *Adjourn at 5:52 EST.*

(For-Against-Abstain-Not responding-Total VM)

Particle Party – TBA

Addendum A

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.

Addendum B
TC 2.4 Planning Subcommittee –Orlando
Meeting Draft Minutes

Tuesday, January 26, 2016
8:00 – 10:00 am
Hilton, Lobby Floor, Lake Nona B

- 1) Call to order and introductions.
- 2) Scope for the Planning Subcommittee

Evaluate and propose methods for improving the operations of TC 2.4 and its subcommittees. 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.
- 3) TC 2.4 Main committee
 - a. Responsible for 8 FAQs. These have been sent out. Only Michael Sexsmith responded.
 - i. Questions 02,11 current wording okay
 - ii. Question 22: switch first 2 paragraphs. Gemma to confirm if chapter S29 has any mention of biocide treated air filters.
 - iii. Question 49: Simple typo last paragraph “laboratories that will”
 - iv. Question 61: Remove 85% reference alongside MERV. Change Gives to Lists in paragraph 1
 - v. Question 61: Editorial Paragraph 1 remove are. Change parentheses around MERV
 - vi. Question 68: Remove sentence “The minimum level of HEPA...” through end of paragraph. Add DOP after exact term and name before PAO. Change to “This method can reveal leaks in...”
 - vii. Question 112: Add comment to ISO 29462. Add ultrafine to KCl. Add optional before informative. *Fully revisit and revise and send out for letter ballot.*
- 4) Planning Subcommittee
 - a. Discuss road map at summer meeting. *Gemma to send out before hand.*
- 5) Membership Subcommittee
 - a. Tom to step down as chair and become vice chair. Jenni Wong to take over effective immediately
- 6) Research Subcommittee
 - a. Michael Waring will be stepping down but Brent Stephens will be stepping in as chair.
 - b. Monitor ongoing sharepoint/basecamp 3 to upload RTARs

7) Standards Subcommittee

- a. *Request same room as 2.3 if side by side slot – Gemma*

8) Program

- a. Still working through issues on using publications time slot to have own program

9) Handbook Subcommittee

- a. No discussion

10) Web Master

- a. ASHRAE is pushing a lot to have 2.4 to move to ASHRAE website instead of NAFA.

11) Old Business

- a. Visitor packet for first-time attendees at the TC meeting. To include explanation of what the TC does, common acronyms, connection with ISO etc. To be posted on the website and used as a flyer. **Bob Burkhead, Gemma Kerr and Brian Krafthefer were tasked with preparing a draft**
- i. *Michael Corbat to follow up with a new attendee. If nothing happens drop after summer.*
- b. TC 2.4 needs an identity graphic or icon for the flyer. **Tom Justice, Al Veeck, Barney Burroughs and Marilyn Listvan agreed to work on producing a TC 2.4 icon by Orlando**
- i. If nothing happens drop after summer.
- c. Indoor Air Quality Association (IAQA) position on filtration. **Gemma Kerr to report.**
- i. ***Gemma to write a formal letter to TAC to request a formal liaison from IAQA.***

12) New Business

- a. Paolo made a request to clarify how US representatives get credentials.
- i. Also request better participation and recommendations from ASHRAE to ISO. *Add this to strategic road map.*

13) Meeting adjourn.

Attendees:

Gemma Kerr
Len Duello
John Simenson
Tim Johnson
Kate Cerully
Marilyn Listvan
Anja Coenen
Kathleen Owen
K.J. Choi

Mick Flom
John Zhang
Paolo Tronville
Michael Corbat
Geoff Crosby
Brian Krafthefer
Matt Middlebrooks
Tom Justice
Dara Feddersen

ADDENDUM C
ASHRAE RESEARCH SUBCOMMITTEE MEETING MINUTES
Orlando, FL
TC2.4 – Particulate Air Contaminants/Removal Equipment

Sunday, June 24, 2016
3:00 – 5:00 PM
Location: Lake Nona B (L)

(Meeting minutes added onto this agenda are in italics.)

1. Call to Order
2. Introductions
3. Review of Agenda
4. Chair's Comments (*Research Subcommittee Chair Michael Waring was not present due to travel problems. Brent Stephens acted as the research chair.*)
5. RAC Liaison update (Pawel Wargocki):
 - a. *Jeff Siegel raised the issue of conflicting language in the "additional information for bidders" language and the 1649-TRP progress-based language on fund disbursement schedules for projects. Mike Vaughan had to intervene just before his submission and struck out the TRP language and kept the boilerplate "info for bidders" section.*
 - i. *This could be problematic in the future because work statements apparently now have to have this disbursement schedule language, but it is in conflict with ASHRAE boilerplate language. RAC/ASHRAE needs to clarify these things for all WS/TRPs moving forward.*
 - b. *Pawel Wargocki's update:*
 - i. *ASHRAE has research funding reserves to spend*
 - ii. *ASHRAE may make funds available in the near future for "dissemination" of funded research project results because they are worried about results not getting out to the broader audience beyond ASHRAE membership*
 - iii. *Grant in Aid submission deadlines will move to the Spring starting in 2017, mostly because RAC was having too many things to review in the December time frame*
 - iv. *No students were nominated for the Homer Adams Award last year (which carries a value of \$5000). They want more nominations for ASHRAE awards.*
 - v. *There are revised guidelines for PMS coming soon*
 - vi. *URPs have been on hold for a while, and are still on hold, while explicit review criteria are generated. Should come online again soon.*
 - vii. *Co-sponsorship for RTARs and WS are getting more important. It will be rejected without co-sponsorship, and it really sounds like RAC wants more co-authorship instead of just co-sponsorship*
6. 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 went out for bid, with proposals due on Dec. 15, 2015. The PES is scoring and recommending a winner this meeting.)
 - i. *Jeff Siegel commented on issue with funding wording (see above)*
 - ii. *The PES (Tom, Gemma, and Paolo – I think that's right) evaluated these projects and rated a unanimous winner, although it was extremely close*
 - iii. *RAC also came up with the same winner, so a winner should be announced soon (as early as Tuesday's 2.4 main meeting)*
 - 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, returned with comments asking for a reduced scope and cost. The WS has been revised by its champion, Paolo Tronville. Intent is to resubmit by the May 15, 2016 deadline.)
 - i. *Some confusion about RAC deadlines. To be clear, things can be submitted to RAC at 3 times per year: May, August, and December 15.*
 - ii. *TC 2.4 needs to vote to reapprove modification. SSPC 52.2 has already voted to co-sponsor again.*
 - c. RTAR 1756, Evaluation of low-cost particle sensors for indoor air quality monitoring in smart building systems – Champion: Brent Stephens, Cosponsored by TC 1.2 (RTAR was tentatively approved by RAC. Others indicated willingness to work on the WS: Vijay (who is also on clean rooms); Heejin Cho (MS State Univ); Zied D. may help with healthcare connections. Any status on WS development?).
 - i. *No movement on this between meetings, but intent to submit by May 15*
 - ii. *Brent Stephens will seek co-sponsorship with TC 7.5 Smart Building Systems*
 - iii. *Al Vatine is also working with a company who makes cheap sensors.*
6. RTAR activity between meetings
- a. 1626-RTAR Energy Implications of Air Filtration in Commercial Buildings (At the Atlanta meeting, a small task group met to reimagine the RTAR slightly, consisting of Brent Stephens, Brian Krafthefer, Jeff Siegel, Zied Driss, Paolo Tronville, Geoff Crosby, Michael Sexsmith, and Michael Waring. This task group did/intends to meet in Orlando to continue the RTAR work.)
 - (a) *Dara Fedderson is champion. Short meeting after TC 2.4 research subcommittee.*
 - (b) *In this meeting, we still have not decided whether to keep pushing this as an energy and filters project (which we think RAC does not want to hear), or to turn this into what it really is – an in-situ systems assessment project that has a filtration component. The latter is probably more realistic, but we decided it would be worth asking Pawel for advice. Brent to send him a copy of what we have now. Mike W. may need to provide previous years' comments.*
 - (a) *For co-sponsorship, Jeff will contact Frank Spevak from Energy Conservatory (TC 5.1 on Fans). We could also reach out to 7.6 Building Energy Performance, who may be more interested in assessing performance than protecting issues w/ fan installations.*
 - (b) *Paolo also mentioned we could just link to GPC 35 potentially.*

- b. Effect of HVAC systems on airborne viral species fate, transport, control, and infection risk – (Champion: Parham Azimi, with Al Vatine and Zied Driss. As of last meeting, 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 was to look more into the work that had been done on this topic and to talk to other TCs. Any progress?)
 - (a) *No real progress, but the 3 main authors met after the meeting. This may very well evolve into a project with specific applications “in healthcare settings” with 9.6 co-sponsorship.*

7. Cosponsored Projects (for reference only)

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

8. Current Research Project

- a. None currently, since 1691-URP was completed. However, 1649-RP will begin soon.

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

- a. 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 May 15. Dave Matier and Paolo Tronville discussed helping. Progress? Kathleen may be interested after February 15. Rahul interested too.)*
- b. RTAR on Round Robin with 52.2. *Now RTAR-1784, which was accepted with comments. Authors are now working on WS. Anja Coenen from Freudenberg is champion. Will try to shoot for May 15 deadline to submit to RAC.*
- c. Embedded sensors in filters. *(Brian Krafthefer is interested in sensors and nanotechnology embedded in filters. Progress?). No progress. Brian was not present.*
- d. 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. Thad. Dan, John Horns, Vijay also. Progress?). *Rahul has put together a rough draft and it needs a lot of work. Will shoot for May 15 deadline for submission to RAC.*
- e. Particle removal by building envelopes (Tabled last time. Keep on list, or remove?). *Remove for next research meeting.*
- f. Characterizing residential mechanical ventilation filtration (Brent Stephens). *Not much interest here, probably remove for next research meeting.*
- g. Developing a database of commercial and residential filtration stats -- efficiency, pressure drop, etc. (Brent Stephens). *Some interest here from Kathleen Owen.*
- h. Impact of filtration on (secondary) organic aerosol (Michael Waring). *No interest. Remove for next research meeting.*

- i. New business/RTAR ideas:
 - a. Tom Justice: Interested in adding filtration into the guidelines for new MTGs for system design in (a) cold climates and (b) hot, dry climates. Also interested in bringing in TC 2.3. Wants to do a literature review. Would be low cost.

10. Liaison Report
See section 5 above.

11. Adjournment

Addendum D
TC 2.4 STANDARDS SUBCOMMITTEE
Minutes

Monday, 25 January, 2016
Hilton, Room Orange Ballroom E (LL)
Orlando, FL
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) 3 addenda will be out for publication at the end of February 2016.
 - ii) Plan to republish in 2016.
 - iii) The group reviewed the details of ISO 16890.
 - iv) Vijay proposed a test methodology for a 52.3 standard.
 - v) RTAR 1784 (Round Robin testing) was accepted by RAC and will now be written into a work statement.
 - b) **GPC 35** – Geoff Crosby
 - i) The group has decided to move forward with the methodologies and tests, and is working on the work statement (WS 1734) for RAC.
 - (1) Preference is to move forward with a different test dust.
 - ii) WS 1734 (new loading dust) was reworked and will be re-submitted before the May 15 deadline. This will be the 3rd submission, and it is expected to hear back in the spring.
 - iii) Submission dates are May, August and December
- 2) **ASHRAE Liaisons:**
 - a) **TC 2.3 – Gaseous Filtration** – Kathleen Owen
 - (1) Ozone work statement came back from the liaison with extensive comments, so it has not been submitted to RAC yet.
 - ii) **SSPC 145.1 Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Media)**
 - (1) Sitting still.
 - iii) **SSPC145. 2, Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Filter)**
 - (1) Reactive air cleaners have been added.
 - (2) They discussed the possibility of starting an RTAR on reactive air cleaners.
 - (3) Standard is due for republication this year.
 - b) **TC 2.9 – UV Air & Surface Treatment** – Matt Middlebrooks
 - (a) SPC got approval to continue as SSPC 185.
 - (b) So far, they have only 4 members on the committee, looking for members.
 - ii) **SPC 185.1 Elimination of Microbial Contaminants in Air**
 - (1) More or less complete.
 - iii) **SPC 185.2 Elimination of Microbial Contaminants on surface**
 - (1) More or less complete

- c) **TC 5.4 – Industrial Air Cleaning** – Bruce McDonald
 - (1) See below.
 - ii) **SPC 199 – MOT for Rating the Performance of Industrial Pulse Cleaned Dust Collectors**
 - (1) SPC 199 went through public review with no comments.
 - (2) Will be published as standard in February or March 2016.
- d) **TC 9.6 – Health Care Facilities** – Zied Driss
 - (1) 50 attendees, nothing important related to Filtration.
 - (2) Update on research project 1630 Impact of lowering the relative humidity in health care facilities.
 - (a) Literature review of 600 papers yielded inconclusive results.
 - (b) Committee voted positive on the research. Project will go to the next phase.
 - ii) **SSPC 170 – Ventilation of Healthcare Facilities** – Zied Driss
 - (1) SSPC 170 met today: pending for public review. Emphasis is on natural ventilation.
 - (2) Discussing the replacement
 - (3) They allocated 40 min to discuss filtration, but lack understanding on MERV terminology.
 - (4) Would be beneficial to have an independent party to give a presentation to SSPC 170 about filtration and testing methods.
- e) **SSPC 62.1 – Commercial Ventilation** – Charlie Seyffer
 - i) No report.
- f) **SSPC 62.2 – Residential Ventilation** – Brent Stephens (Tom Justice)
 - i) Proposed upcoming change to the standard.
 - ii) Discussed comments from Bob Burkhead and Tom Justice
 - iii) Discussion about CO₂ levels were very controversial.
 - iv) Particulate filtration well covered (Tom Justice).
- g) **SSPC 90.1 Energy Eff. Design of New Bldg** – Christine Sun
 - i) No report.
- h) **SSPC 161 – Air Quality in Commercial Aircraft** – D. Matier
 - i) Will be pulled from agenda.
- i) **SPC 180 – Inspection & Maintenance of HVAC Systems** – Phil Maybee
 - i) The standard 180 meeting was based around the rewrite of the standard most driven by California contractors to make a version that they can use with public entities in California.
 - ii) Phil's concern is that they would like to have the standard state that filters should be changed quarterly – so trying to get the language back to checking pressure drop as first reference – otherwise not much activity for filtration
- 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) No update.
- k) **SPC 189.2 Design, Construction and Operation of High-Performance Green Healthcare Facilities (?inclusion of IAQ)** –
 - i) No update.
- l) **US TAG for ISO TC142** – Rahul B. and Don Thornburg (Matt Middlebrooks)
 - i) WG3: update on the new ISO 16890 standard. 4th part of the standard
 - (1) All 4 parts will come out together on the same schedule.

- (2) FDIS will come out in 2 to 3 weeks (are at ISO being edited)
- (3) If that goes through and follows standard timeline, Q3 2016.
- (4) Have been developed under the Vienna agreement: This means that ISO 16890 will replace the EN779, CEN members have 6 months to withdraw the EN779, otherwise they will get penalties.
 - (a) US does not have the same procedure.
- (5) WG 3 will continue to exist and be around to tweak.
- (6) ISO 16890 will not necessarily become an ANSI standard.
- (7) In order for a standard to become an ANSI standard, it has to go through the ASNI progress by an organization member, such as ASHRAE. That means that ASHRAE has to make the decision to adopt the standard.
- (8) Revision process of ISO: after 5 years, the TC has to decide whether to confirm, withdraw or revise the standard. The TC can address any issues by asking ISO to start a work item before.
- (9) Tom Justice suggests to hold a workshop at the next ASHRAE meeting to educate people about the upcoming ISO. Don Thronburg states that he has tried it at least 3 times before, but has been rejected every time. John Sabelli adds that if you want to make a presentation, you can use the TC meeting time.
- (10) Paolo has handed in a conference paper to ASHRAE regarding ISO 16890 and ASHRAE 52.2.
- ii) WG12 sustainability
 - (1) Kick off meeting was in September in Kanazawa, Japan.
 - (2) They are facing similar challenges as GPC 35.
 - (3) Ongoing round robin testing 5 dusts in 9 labs. Results expected in spring 2016.
 - (4) Meeting in Milan has been postponed as data not available yet.
 - (5) Updates are expected at ASHRAE summer conference in St. Louis or at the ISO meeting in Atlanta.
- m) **GPC 23 Guideline for the Design/Application of HVAC Equip. for Rail Passenger Vehicles** – Tom Justice
 - i) No update, as no volunteers attended the meeting.
- n) **Environmental Health Committee** – Barney Burroughs
 - i) No update.
- o) **GPC 29-2009R Guideline for the risk management of public health and safety in buildings**
 - i) No update.

3) **Old Business**

- a) **Report of Working Group Regarding: Proposal for new standard regarding residential filter test method** – Tom Justice, Chair
 - i) Sent to ASHRAE, came back with comments.
 - ii) Tom has been pushing hard with 66.2 for this new standard.
 - (1) Vote 13-0-0 in favor of new standard.
 - iii) Remark from Tom Justice, “Have your research lined up if it is critical to the standard.”
 - iv) Residential research project has been approved.
 - v) Tom will continue to push forward.
- b) **MTG on operations and maintenance activities that impact energy efficiency**

(approved 2015 – no number assigned yet)

i) Official name is MTG.O&MEE, but no update.

4) New Business

a) GPC 27 Measurement Procedures for Gaseous Contaminants in Indoor Environments

- i) Chair of GPC 27 suggested to include particulate matter, so GPC 27 asks if TC 2.4 has any interest in reviving GPC 17: Sampling of airborne particle concentrations in commercial and residential buildings.
- ii) Poll of the room revealed that only 5 people had recollection of past efforts of GPC 17.
- iii) Paolo Tronville: Not a lot of people were working on it back then.
- iv) Group is against reviving GPC 17 as it is “dead in the water without a chair”.
- v) Paolo will inform TC 2.3 standards, that TC 2.4 has currently no interest of reviving GPC17.

5) Information Exchange:

a) AFS – KJ Choi

- i) Oil, Gas and Chemicals Filtration & Separations Conference – Expo (May 9 – 11, 2016, Houston Marriott Westchase)
- ii) World Filtration Congress (April 11 – 16, 2016, Taipei International Convention Center, Taiwan)
- iii) AFS Fall Conference (October 24 to 26, 2016, San Diego)

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

- i) Meeting will be held in March in Milan, Italy.
- ii) They need to decide what to do about the EN 1822 HEPA / ULPA, keep it or adopt ISO 29463. There is no technical reason to adopt the ISO standard, but it is a lot of bureaucracy, as EN1822 is referenced in many other documents.
- iii) New initiatives will be discussed, but it is difficult now to give an update.
- iv) More updates expected in at ASHRAE Summer Conference in St. Louis.
- v) WG 2: EN 1822 will meet in Milan the week before.
- vi) WG 6: New methods of measurement of media against particles will meet in Milan. Has been accepted and first draft will be circulated soon. Target to finish in 2018 with publication.

c) Eurovent – Paolo Tronville

- i) Founding meeting at the end of March in Brussels for 2 days. Meeting is also open for laboratories.
- ii) Starting a new group dealing with filters for addressing the Eco design in Europe
- iii) 2 phase transitions from EN779 to the new standard. Have to redraft documents with Eurovent certifications to include the PM classes instead of EN779 classes.
- iv) After ISO has been published and is adopted in European countries, all documents have to be updated.
- v) Eurovent has published a recommendation on calculation and taking away the classification.
- vi) Initiating a special project group to meet more often for two years. Project group will prepare data and documents to implement in the European legislation and standards dealing with aspects related to air filtration.

- d) IEST – Institute of Environmental Sciences and Technology – Vijay**
 - i) No update.
 - e) INDA – International Nonwovens Development Association –**
 - i) INDA Filtration 2016 show will be in Philadelphia in November. No schedule yet.
 - f) NAFA – Stephen Nicholas**
 - i) NAFA Conference will be held in Phoenix April 6–8, 2016.
 - g) ISO TC 22/SC 7/WG 3 & WG 11 – Paolo Tronville**
 - i) WG3 – Name has changed to subcommittee ISO TC 22 subcommittee 34. Fuel injection equipment. Paolo is not attending the groups.
 - ii) Completing the revision of ISO 103 fine dust
 - iii) Developing two new documents for other loading dusts: Soot and ultra-fine salt particles.
 - h) UL 900 – R. Haseman**
 - i) UL performed more tests to evaluate reproducibility of the test duct.
 - ii) Parameters evaluated: Air flow and test duct temperature.
 - iii) First round of experiments have been done, more updates at the next meeting in St. Louis expected.
 - i) IAQ Meetings – J. Siegel**
 - i) No update.
 - ii) ASHRAE meetings: Alexandria, Virginia, Sept 12 to sept 14 Defining IAQ standards and best practices
 - j) Filtech Expo and Conference**
 - i) Will be held in Cologne, Germany October 10-14.
 - k) Indoor Air 2016**
 - i) Conference will be held July 3-8 in Ghent in Belgium
 - l) American Association for Aerosol Research**
 - i) Conference will be held in Portland, Oct 17 to 21 2016
- 6) Adjourn – 6:00 pm**

7) Attendees

	Name	Company/Address	Email
1	John Simenson (Chair)	Johns Manville	
2	Anja Coenen (Vice-Chair)	Freudenberg	
3	Paolo Tronville	Politecnico Di Torino	
4	Len Duello	Georgia-Pacific	
5	Don Thornburg	Camfil	
6	Michael Sexsmith	Ahlstrom	
7	Tim Johnson	TSI	
8	Zied Driss	Camfil	
9	Geoff Crosby	Lydall	
10	Tom Justice	Zene	
11	Rahul Bharadwaj	AAF International	
12	Donna Sullivan	Lydall	
13	Kathleen Owen	RTI	
14	Matt Middlebrooks	Filtration Group	
15	John Zhang	3M	
16	John Sabelli	A2LA	
17	Al Vatine	LMS Technologies	
18	David Matier	Freudenberg	
19	Awad Khan	Freudenberg	
20	Todd McGrath	Glasfloss Industries	
21	Jeni Wong	Johns Manville	
22	Mick Flom	3M	
23	Monroe Britt	Green Leaf	
24	Kyung-Ju Choi	Clean & Science	
25	Mark Anttila	Lydall	
26	David Christopher	HDK Industries	
27	Dara Feddersen	Hollingsworth & Vose	
28	Peter J. McKinney	StrionAir/Carrier	
29	Tyrone Cunningham	StrionAir/Carrier	
30	Joel Davis	Flanders Filters	
31	Satish Dinakaran	Flanders Filters	
32	Randy Haseman	UL	
33	Matt Ball	Koch Filter	
34	Keith Chesson	Clarcor Air	
35	Jean Girard	Texel Inc.	
36	Don Largent	Air Techniques Int'l	
37	Bob Burkhead	Blue Heaven Technologies	
38	Joshua Manasco	Elmarco, Inc.	

Addendum E
TC 2.4 PROGRAMS SUBCOMMITTEE
Minutes

DRAFT

TC 2.4 PROGRAM mtg Tuesday 1/26/2016 10:00 – 11:00 (room Lake Nona B, Lobby level)

21 attended, nothing was accepted for Orlando (2.3 has one Wed. morning, Seminar 60) we had 2 conference papers

NEED writing clearer outcomes of expected discussion for Forums & Seminars & SEND Abstracts for feedback to ML, Donna & Dara & TRACK CHAIR

Track 1: Advances in Refrigeration Systems and Alternative Refrigerants

Track Chair: Frank Schambach Email: frankschambach@mindspring.com

This track seeks papers and programs that explore the wide range of refrigeration systems under development with special emphasis on the use of alternative refrigerants in vapor compression machines to address environmental concerns.

Track 2: Research Summit **Track Chair: Jeffrey Spitler** Email: spitler@okstate.edu

The fourth annual Research Summit seeks papers that report results on any aspect of ASHRAE-related research including heating, cooling, ventilation, other energy uses in the engineered environment and associated environmental aspects.

Track 3: Fundamentals and Applications **Track Chair: David E. Claridge** Email: dclaridge@tamu.edu

Fundamental information and applications of fundamentals related to all aspects of HVAC&R are welcome. This can range from psychrometric properties and processes to combustion, controls, HVAC system and envelope fundamentals and beyond.

Track 4: HVAC Systems and Equipment **Track Chair: Alan Neely** Email: alan_neely@pglcorning.com

This track will include presentations on best practices to implement traditional, non-traditional, and hybrid approaches to achieve successful HVAC&R systems design. Objectives include high performance systems and equipment, LEED certified designs and sustainable buildings.

Track 5: Smart Building Systems/Remote Monitoring & Diagnostics **Chair: Samir Traboulsi** traboulsi.samir@gmail.com Smart buildings address HVAC&R equipment operation (chiller sequencing, soft start), integration into complete systems and can potentially interface with multiple building complexes and micro grid operation. This track includes papers on advanced communication protocols, system integration, BMS tools, data management and analysis.

Track 6: Indoor Environment: Health, Comfort, Productivity **Chair: Dennis Alejandro** denzjac@yahoo.com Buildings and other enclosed spaces are increasingly required to provide safe, healthy environments in an energy efficient manner. Papers in this track will review the balance between environmental health and energy efficiency in buildings and help define future education, policy and research directions.

Track 7: Professional Skills Beyond Engineering **Track Chair: Rachel Romero** rachel.romero@nrel.gov This track seeks to ensure professional skills are being developed and maintained beyond engineering essentials. Emphasis will be placed on meeting the professional development and business needs of today and converting them into the building blocks of tomorrow's success.

Track 8: Renewable Energy Systems and Net Zero Buildings **Track Chair: Kevin Gallen**

Email: kevin@gallenengineering.com Wind, hydroelectric and solar are just a few of the alternative and/or renewable energy sources that are being used in HVAC design as we strive for Net-zero and high efficiency buildings. This track will address recent advances in alternative energy systems and equipment and new design strategies for achieving Net-zero buildings.

Conference Program Chair: Tom Kuehn Email: kuehn001@umn.edu

Staff Support Tiffany D. Cox Assist. Manager of Conf. Programs Email: tcx@ashrae.org

For information on the technical program, special events, special sessions & general conf. inquiries

Workshops need Learning OBJECTIVES written

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

St. Louis seminar & forum & Workshop proposals (abstracts) deadline = Feb 8th

>>>>

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 St Louis =

June 25-29, 2016

Type	Title	CoSponsor	Chair	TRACK
TC Workshop??	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	n/a
Seminar	Do we Need a Separate Test Standard for Residential Filters? (John Zhang, Rahul Bharadwaj, Brian Krafthefer and Brent Stephens/Ian Walker)	2.4	Tom Justice	
Seminar	Do you know what you are breathing: Room Air Contaminants	2.4, 2.3	KJ Choi --John Zang, Brent Stephens? Odors	

Workshop	Are the Rumors of MERV's Death Exaggerated? (Don Thornburg, Bruce McDonald, Anja Coenen)	52.2	Don Thornburg, Bruce McDonald, Anja Coenen	
Proposed for Future Vegas =		Jan 28 - Feb 1, 2017		
Type	Title	CoSponsor	Chair	TRACK
Seminar	Gambling with your Filter co\$t\$t? 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, Geoff Crosby Steve N, VJ Geoff & Paolo T (Intl, later)	
Seminar	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	
Forum /Workshop	Guideline 29 (Building Security, Chem Bio)	TG2(looking for 2.3, 2.4 cosponsors)	Scott Campbell	
Newer ideas - Long Beach and /or beyond				
Seminar	Smart Filters (Sensors & Filter Operations) (Brian, Brent & Michael??)	2.4, 2.3, 62.2, 62.1	Brian Krafthefer	
Conf. paper (Abstract due tbd)	<u>How can Filters be rated by their PM (PM1, PM 2.5, PM 10, etc.) performance?</u> (Thad Ptak, Bret Stevens?, Michael Waring?, Bruce McDonald)	<u>52.2 ?</u>	<u>Don Thornburg Brent Stephens / Michael Waring</u>	
Conf. paper (Abstract due tbd)	Filtration for Hospitals (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 ??	
Seminar	Future Filtration Needs (Fines & Ultrafines??/ VOCs)	2.4 & 2.3		
Tech paper(s)	Climate Degradation effects on Filtration		Brian Krafthefer	
A	Tim Johnson	Len Duello		
T	Brian Krafthefer	Anja Coenen		
T	Kyung-Ju (K J) Choi	Don Thornburg		
E	Gemma Kerr	Paolo Tronville		
N	Tim Johnson	Kate Cerully		
D	John Simenson	Michael Corbat		
E	Joel Davis	Geoff Crosby		
E	Steve Nicholas	Josh Manasco		
S	Kathleen Owen	H.E. Barney Burroughs		
*	Donna Sullivan	SubCom co-chairs	Donna Sullivan	
*	Dara Feddersen	SubCom co-chairs	Dara Feddersen	
*	Marilyn Listvan	SubComm chair	Marilyn Listvan	

Wayne Thomas

Dr. Sanjay

Rajagopalan

Bill Bahnfleth

cardio vascular n particles

effects of ultrafines