

Draft Minutes
TC 2.4 Particulate Contaminants/Removal Equipment
Main Committee Meeting
St Louis, Tuesday June 28, 2016
3:30-6:00 pm
Landmark 2, Conference Plaza Level 1, Marriott St Louis Grand

1. Call to order..... Gemma Kerr
2. Introductions – 7 YEA Members
3. Roll call Michael Corbat

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	
Rahul Bharadwaj		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		16	1
				Total Members			17

Non-Voting Officers

- | | |
|-----------------|-----------------------|
| Don Thornburg | Vice Chair |
| | Program & |
| Marilyn Listvan | 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 |

4. Welcome and opening comments Gemma Kerr
 - a. See *Addendum A* for ASHRAE Code of Ethics
 - b. ASHRAE would like to reduce the hours spent in meetings
 - c. Can we do more between meetings?
 - d. ASHRAE would like us to use Basecamp which is an online document sharing location
 - e. Will no longer take votes to approve verbal report (Not required)
5. Particle Party..... Keith Chesson
6. Approval of Orlando Minutes draft as distributed..... Michael Corbat
 - a. Motion to Approve – K. Chesson. E. Brodsky 2nd 14-0-1-1-16 (CNV)
7. Record of votes taken since Orlando Michael Corbat
 - a. 1756-WS, title ***Evaluation of particle sensors for indoor air quality monitoring and smart building systems***, has been approved for submission to RAC.
 - b. 13-0-1-3-17 (CV)

8. Subcommittee Reports
 - a. Planning Subcommittee Report..... Don Thornburg
 - i. Reducing the amount of time spent in meetings
 - ii. Moving to 1 hour for Standards preceded by 1 hour of 2.3 Standards, and 1 hour of 2.3/2.4 Pubs
 - iii. Make reports more brief
 - iv. Get all subcommittee chairs to get agenda to Chair 1 month before meeting
 - v. Planning to meet only in summer
 - vi. Pres. Ad-Hoc to get ASHRAE standards to ISO or the reverse
 - vii. Need to get items posted to web
 - viii. Vote to approve 8th FAQ as presented by Gemma and return to ASHRAE
 1. Motion – B. McDonald, T. Johnson 2nd 15-0-0-1-16 (CNV)
 - ix. MTG_ACR B. Burkhead - Alternate, S. Nicholas – Primary
 1. Motion – B. McDonald, K. Chesson 15-0-0-1-16 (CNV)
 - x. For full Report see *Addendum B*
 - b. Membership Subcommittee Report..... Tom Justice
 - i. Michael Sexsmith emergency removal and emergency replacement with Rahul Bharadwaj
 - ii. Randy Hasemen, Paolo Tronville, Tim Johnson rolling off
 - iii. Matt Middlebrooks, Zied Driss, Dara Feddersen , Michael Corbat rolling on
 - iv. Exec Gemma Kerr-Chair, Michael Corbat-Vice Chair, Zied Driss-Secretary
 - c. Research Subcommittee Report..... Brent Stephens
 - i. 1 currently funded project led by Jeff Siegel, RP-1649
 - ii. WS – 1734 conditionally accepted, championed by Paolo Tronville
 - iii. WS-1756 RAC will not vote on it for 3 months, championed by Brent Stephens
 - iv. RTAR 1726, Championed by Dara Feddersen will be resubmitted
 - v. For full Report see *Addendum C*
 - d. Standards Subcommittee Report..... John Simenson
 - i. SSPC 52.2
 1. Several addenda approved
 2. Presentation provided by Don Thornburg comparing 16890 and 52.2
 3. Task group established to examine a 52.3 as proposed by Vijay
 - ii. GPC 35
 1. Comparison of multiple energy classification methods
 - iii. US TAG for ISO TC 142 is one of the strongest
 - iv. ISO 16890 is out for vote for full approval
 - v. ISO TC 142 Plenary meeting in Atlanta in September
 - vi. For full report see *Addendum D*
 - e. Program Subcommittee Report..... Marilyn Listvan
 - i. Track 4 for Las Vegas is best opportunity
 - ii. Submission deadline for Las Vegas is August 8
 - iii. Had Workshop 01 in St. Louis attended by 53 people
 - iv. Lan Chi Weekes from EHC requested 1 speaker on nano particulate for Las Vegas seminar
 - v. Policy Changes

1. Papers submitted must have online bias filled out.
 2. CEC to review speakers and allow up to 5 non-ASHRAE per conference to have fees paid
 3. 3 strikes you're out if papers are not uploaded on time, will not be allowed to present
- vi. ***Gemma will write a letter to CEC regarding procedure for submitting without needing to get abstract from speakers. Make it a 3 step process which would include conditional acceptance.***
 - vii. See *Addendum E* for full report of upcoming proposals
- f. Publications Subcommittee Report..... Marilyn Listvan
 - i. Meeting on Monday 3:15-4:15 being used for presentations.
 - ii. Please send any references to articles, papers, etc. to Marilyn to build reference library
 - g. Web Master..... Bob Burkhead
 - i. 2.4 site has been mapped from NAFA to ASHRAE by Ken Cooper, but still has significant issues.
 - ii. ***Need to find a new home for particle party pictures – Bob Burkhead***
 - iii. ***Naming convention needs to be clarified for agenda and minute file names before uploading to be confirmed by Bob Burkhead***
 - h. Handbook..... Eric Brodsky
 - i. Chapter 29 updated and sent out in new handbook
 - ii. No meeting this conference (will reconvene as needed)
 - iii. ***Eric to look into updating other areas of handbook that are out of date and notify other TCs***
9. Reports from other TC liaisons
 - a. 62.2 – Brent Stephens – Addendum K recommendations on filtration to reduce PM2.5 in residential indoor recirculation has been adopted.
 - b. EHC – Lan Chi Weekes (visiting) – Multiple documents being revised. Is a standing committee that provides position papers. Members are appointees, but meetings are open to visitors.
 - i. Working on E-cigarettes position paper.
 - ii. How to deal with high levels of PM2.5 in high performance buildings
 - iii. Should committee review online position papers
 - c. TAG to ISO TC 142 – Rahul new chair, Dara vice chair, John Simenson new secretary
 - d. ISO TC 142 WG3 – 16890 out for final vote. Maybe 2 or 3 more meetings for cleanup.
 - e. ISO TC 142 WG12 – Nothing is happening and no meeting in Atlanta
 10. Old Business
 11. New Business
 - a. Misc Announcements (Conferences, Awards, etc.)
Barney Burroughs received the prestigious Andrew T. Boggs award
Matt Middlebrooks received Distinguished Service award
 12. Adjournment – Motion B. McDonald, K. Chesson

Action Items are Bold and Italicized

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 – St Louis
Meeting Minutes (Draft)

Tuesday, June 28, 2016
8:00 – 10:00 am
Convention Center, Room 120, First Floor

- 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. *Paolo believes that there may be too many meetings. Total of about 18.5 hours just dedicated to 2.4 activities. ASHRAE has also made similar comments per Gemma. No changes going to immediately enact because there is some benefit to meeting face to face, but a recommendation to get the routine out of the way before meeting.*
 - b. *Look into cutting down 2.4 Standards to 1 hour. Joint publications, 2.4 Standards, 2.3 Standards all back to back in 1 hour block. Trial to take place in Las Vegas. Meeting room request in a package.*
 - c. *Can we make reports more brief in main meeting?*
 - d. *Eliminate vote of acceptance of reports in the main meeting? Will trial with this meeting. Will allow people to comment on report.*
 - e. *We should post draft agendas to the web 1 Month in advance for the main and all subcommittees. Long term we should move from emailing to posting to web only. Overlap in the short term.*
- 4) Planning Subcommittee
 - a. *Should this meet less or in 2.4 main meeting? Proposed meeting only in summer meetings. Possibly alternating a time slot with TC 2.3?*
- 5) Membership Subcommittee
 - a. *Looks to be in good shape with new chair.*
- 6) Research Subcommittee
 - a. *Need to make sure agenda gets to everyone.*
 - b. *Don commented that committee is running as efficient as ever.*
- 7) Standards Subcommittee
 - a. *See note above regarding timing change.*

- b. *ASHRAE has set up a Presidential Ad-Hoc committee to figure out how to get ASHRAE standards to become ISO standard (or adopt an ISO standard).
Comments to Matt Middlebrooks as a member of the committee.*

8) Program Subcommittee

- a. *Need to make sure we are in line with theme of the meeting.*
- b. *Need to make sure we are able to get more programs on.*

9) Handbook Subcommittee

- a. *Going well. Need a vice chair.*
- b. *Should we update more information for electronic version.*

10) Web Master

- a. *Need to figure out how to make sure items are uploaded in a timely manner.*

11) Old Business

1. *Visitor packet/logo for first-time attendees at the TC meeting: Continue or drop?
Gemma will send out a draft to committee members and any interested parties.*
2. *Revision of ASHRAE FAQ 112 – Reviewed information for questions 8, wordsmithed slightly and will send to committee for vote.*

12) New Business

1. *ASHRAE Multi Task Group (MTG) on Air Change Rates (ACR): Should TC 2.4 join?
Overwhelming response to email was yes we should. Need to volunteers from 2.4 (does not need to be a voting member). One person acts a primary for votes and one as alternate.*
2. *Road Map Update. 2015 version has been circulated for review – Gemma to review the Road Map and prioritize.*

13) Meeting adjourn.

Addendum C
ASHRAE RESEARCH SUBCOMMITTEE MEETING AGENDA
St. Louis, MO
TC2.4 – Particulate Air Contaminants/Removal Equipment

Sunday, June 26, 2016

3:00 – 5:00 PM

Location: Room 231 (2)

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

1. Call to Order. *Brent called the meeting to order at 3:02pm.*
2. Introductions. *The people in the room introduced themselves. 56 people were present according to the sign-in sheet.*
3. Review of Agenda. *Chair reviewed agenda. Thanked Michael Waring for his service as research chair over the last few years.*
4. Chair's Comments
 - a. Goals of TC 2.4 research subcommittee:
 - i. Always have one funded project
 - ii. Others? Work on committee goals later in this meeting (agenda item 10)
 - b. Reminders from last meeting: *Brent talked through these reminders.*
 - i. RAC deadlines (M-A-D, May, August, December 15)
 - ii. ASHRAE has research money to spend
 - iii. Homer Addams award nomination (\$5000 to grad student)
 - iv. URPs on hold for now
 - v. Co-sponsorship for RTARs and WSs are getting more important
 - vi. GIA submission deadlines are moving to springtime (i.e., March)

Pawel Wargocki (RAC liaison) gave a short update: Change to NIA eligibility, but he gave no details; Homer Addams award for GIA winning students or involved in ASHRAE sponsored project; GIA is now divided into 2 awards, \$5k at awarding, and \$5k upon completion of project; RTARs should be written so non-experts can easily understand them but are convincing (be clear on benefit for ASHRAE); WS 1734 was Conditionally Approved, so it will go for bid next cycle.

Paolo Tronville gave an update afterward on WS 1734, and reminded the TC what the scope was. He stated he could make any necessary changes so it could go for bid soon.

5. Active project updates
 - a. 1649-TRP Impact of Higher Efficiency Filtration on IAQ in Residential Environments with Central HVAC. PI: Jeff Siegel, University of Toronto. PI and PMS provide 5-minute updates. PMS: Tom Justice, Brian Krafthefer, John Zhang, and Gemma Kerr. PMS to meet Saturday June 25 1:30 – 2:30 pm in Room 123 (1) [Update: the Saturday meeting has been cancelled].

Jeff Siegel gave a summary of 1649 to the TC. Although the contract has only recently been finalized, they began working on protocols for a few months already. They will be measuring PM concentrations using a number of both short-term and long-term methods in 18 homes in Toronto with a combination of filters: MERV 6 (or 8), 11 and 15, some electric, some not. He also gave an update from the PMS meeting before the research subcommittee meeting. The slides will (may?) be attached to the minutes.

Some issues were raised: MERV 15 is not available in 1" if mechanical; Jeff talked about working with the PMS to help guide him on filter selection; he also mentioned the variability of pressure drop in filters. Vijay cautioned against choosing filters too thoughtfully since that would take the randomness out of the sample selection; Geoff Crosby asked how the 18 homes were chosen (answer is that it's a sample of convenience; he will provide list of 30 homes to the PMS, which will choose the final 18 homes); Thad Ptak asked about statistical plans for data analysis and argued for using statistical considerations to guide home and filter selection (Jeff answered this was not possible due to the study size); Al Vatine asked what forensic filter tests would be performed; Paolo Tronville asked about pets; Brent Stephens asked about what modeling would be done (general filter and cost-benefit modeling); Christine Sun, what about window opening and AER? (no window opening); Jeff showed some CO2 data he's collected to demonstrate a novel method of calculating AERs that he is trying.

6. Work Statement activity between meetings

- a. 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
 - i. WS revised and submitted May 2016 and voted Yes by TC 2.4 (and SSPC 52.2?)
 - ii. *WS was conditionally accepted at this meeting.*
- b. RTAR 1756, Evaluation of low-cost particle sensors for indoor air quality monitoring in smart building systems – Champion: Brent Stephens, Cosponsored by TC 7.5 Smart Building Systems
 - i. WS submitted May 2016 and voted Yes by both TC 2.4 and 7.5
 - ii. *Brent mentioned that he, Vijay, and TC 7.5 worked on the sensors WS, and have gave a quick rundown of the project. How well do cheap PM sensors work to monitor building control applications or monitoring. The WS was submitted on time for the May RAC deadline, but unfortunately it was mishandled within ASHRAE and was never put on the agenda for RAC to review.*

7. 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)
 - (a) Dara Fedderson is champion. Short meeting after TC 2.4 research subcommittee.

- (b) *Dara updated that Pawel had made comments that need to be addressed; Dara discussed wanting to try to make things more obvious for RAC; Brent discussed showing examples of importance of energy impacts of filters with scaling calculations.*
- (c) 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.
- (d) 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) *Zied – said it's on hold for now.*

8. 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)
Proceeding on time, and all field work has been completed.
Gemma pointed out how there should be a TC 2.4 member on the PMS.

9. Liaison Reports *No other liaison reports.*

10. Other roles/activities that this subcommittee needs to be filling – *Brent wanted to talk about bigger vision of TC roles.*

- a. Publishing and communicating research outcomes – *Brent Stephens used segue of MTG discussion to lead into broader discussion of where the TC Research needs to go. Brent encouraged people to think about disseminating their work to a broader audience.*
Question: how flexible is ASHRAE of posting presentations on our TC website. Bruce brought up number of times MERV 6 comes up in discussions; he used that as an example of how we need to get more information out there.
- b. *Brent brought up how Handbook can ask Research for what it needs.*
 - i. ASHRAE Journal articles based on previous TC 2.4 research?
 - a. Paolo's recent article in the Journal
 - ii. ASHRAE Handbook updates based on previous TC 2.4 research?
- c. Research plan for TC 2.4
 - i. Priorities
 - ii. Industry engagement

11. 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.)*
 - i. *Still no progress; Bob thinks there is not much interest. Likely to be dropped.*
- 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.*
 - i. *No progress, but will regroup for second half of year.*
- c. Embedded sensors in filters. *(Brian Krafthefer is interested in sensors and nanotechnology embedded in filters. Progress?). No progress. Brian was not present.*
 - i. *No progress. Brian has health issues.*
- 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.*
 - i. *Will keep working, will shoot for August 15 deadline; Rahul needs feedback to help get things moving forward; wants Brent to read through and provide feedback; Rahul will send out to group and Brent and will move along.*

- e. Particle removal by building envelopes (Tabled last time. Keep on list, or remove?). *Remove for next research meeting.*
 - i. *Remove.*
- 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.

Tom talked about need to get involved and name a person to sit on different MTGs so that we can have a voice on relevant publications and guides. Gemma said two people for each MTG are required (main +alternate since they are voting positions); she also urged the need for us to get involved and make sure our expertise is well represented.

Bob Burkhead – in 52.2 meeting, talked about beginning of demise of MERV. Working on other next step issues – new protocol that involves a chamber test with duct-mounted filters, that looks into what happens in a room with a filter that may supplement some elements of 52.2; would work primarily to supply guidance to 62.1 and 62.2;

Brent suggested getting a group together to figure out how to use the chamber in effective means – suggests a small working group for advantages and disadvantages.

Those want to help: Vijay, Gemma, Bob, Phil Winters, Michael Waring, Don Thornburg, Mick Flon

Tom – need to get in front of VRFs and have a filtration perspective.

Vijay – small project of review of all the things we've done, and a distillation of that in some format. Geoff brought up an MTG whose job it is to do just this; Vijay wants something on a smaller scale. Vijay and Brent will work on it.

Marilyn wants to add references to our website of publications by members.

Paolo – typical PM size distribution indoors, what are typical PSDs for different activities indoors? Paolo, Michael, Brent, Peter McKinney.

12. Adjournment – adjourned at 4:54pm.

Addendum D
MEETING Minutes
TC 2.4 STANDARDS SUBCOMMITTEE

Monday, 27 June, 2016
Marriott, Majestic A (Conference Plaza 2nd Level)
St. Louis, MO
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 MoT Air Cleaners for Particle Size Efficiency** – Michael Corbat
 - i) All comments from Addendum G were approved.
 - ii) Addendum H was approved.
 - (1) Addendum I was approved (test dust reference).
 - iii) Saturday morning committee meeting - proposals were discussed regarding the next test standard. Suggestions for TC 2.4 to have a task group to investigate Vijay's proposal: developing a PM based method going down to small particles.
 - iv) Don Thornburg gave a presentation comparing 52.2 to ISO 16890.
 - v) Discussion about modification of test method to use electronic air cleaners.
 - (1) Donna Sullivan, Phil, Kathleen Owen, Keith, John will look at this proposal.
- b) **GPC 35** – Geoff Crosby
 - i) WS1734: Method to generate new aerosol has been approved by RAC. Go ahead in September.
 - ii) Debating methodology: comparing Energy Consumption methods (Eurovent, Vijay, Montgomery paper). Worked through procedural substance. Will work more during ISO meeting in Atlanta.

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)**
 - (1) Setting up groups to add reactive air cleaners to the method.
 - (2) Writing an RTAR to do a lit review.
 - ii) **SSPC 145. 2 Test Methods for Assessing Performance of Gas Phase Air Clean. Equip (Filter)**
- b) **TC 2.9 – UV Air & Surface Treatment** – Matt Middlebrooks
 - i) **SSPC 185 MoT to Inactivate Microorganisms in HVAC Systems with UV-C lights**
 - (1) **SPC 185.1 Elimination of Microbial Contaminants in Air**
 - (a) Under continuous maintenance.
 - (b) Is based on 52.2 methodology
 - (2) **SPC 185.2 Elimination of Microbial Contaminants on surface**
 - (a) Under continuous maintenance.
- c) **TC 5.4 – Industrial Air Cleaning** – Bruce McDonald
 - i) **SPC 199 – MoT for Rating the Performance of Industrial Pulse Cleaned Dust Collectors**
 - (1) 199 has Has been published in the last week. Available as pdf online!
 - (2) SPC will stick around for 1 year to address any concerns, questions.

- (3) Workshop in Las Vegas during ASHRAE Winter Conference.
- d) **TC 9.6 – Health Care Facilities – Zied Driss**
 - (1) Are more receptive to filtration. Airborne infectious disease. Considering remodeling coughing and sneezing.
 - (2) Have research regarding humidity and efficiency.
 - (3) Dr. Farrad is considering to run particle counts in hospitals
 - (4) SC Handbook: Have almost nothing about filtration and are considering changing.
- i) **SSPC 170 – Ventilation of Healthcare Facilities – Zied Driss**
 - (1) Interim meeting, but Zied couldn't attend
 - (2) Pushing filtration table.
 - (3) Have a conflict with 62. MERV 7 vs MERV 8.
 - (4) New subcommittee: Natural ventilation.
- e) **SSPC 62.1 – Commercial Ventilation – Charlie Seyffer**
 - i) No report.
- f) **SSPC 62.2 – Residential Ventilation – Brent Stephens, Tom Justice**
 - i) Are narrowing down a list of contaminants. Still working on how to do to it. Working on equation.
 - ii) Re-published their standard: 62.2-2016
- g) **SSPC 90.1 Energy Eff. Design of New Bldg – Christine Sun**
 - i) No report.
 - ii) Christine Sun does not attend the meeting anymore.
- h) **SPC 180 – Inspection & Maintenance of HVAC Systems – Phil Maybee**
 - i) Considering adding a 4th column for IAQ.
 - ii) Very little happened.
 - iii) Schedule to re-write for 2018.
- i) **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 report.
- j) **SPC 189.2 Design, Construction and Operation of High-Performance Green Healthcare Facilities (?inclusion of IAQ) –**
 - i) No report.
 - ii) John will request a volunteer.
- k) **US TAG for ISO TC142 – Rahul Bharadwaj**
 - i) US tag is very strong. One of their better and more active US Tags that ASHRAE administers.
 - ii) 16890 is coming out for ballot as FDIS.
 - iii) HEPA standard is coming out for revision: Table was split to make it more compatible with other standard.
 - iv) Not much activity on an ISO level.
 - v) Atlanta: US is hosting in September. Still looking for sponsors. 12 companies, 5 companies have written a check.
- l) **GPC 23 Guideline for the Design/Application of HVAC Equip. for Rail Passenger Vehicles – Tom Justice**
 - i) No report.
- m) **Environmental Health Committee – Barney Burroughs**
 - i) No report.
- n) **GPC 29-2009R Guideline for the Risk Management of Public Health and Safety in Buildings**
 - i) No report.

- o) MTG.O&MEE, Operations and Maintenance Activities That Impact Energy Efficiency**
 - i) No report.

2) Old Business

- a) Report of Working Group Regarding: Proposal for new standard regarding residential filter test method – Tom Justice, Chair**
 - i) We were giving support by 62.2 that was contingent upon certain things (showing results). We will form an MTG (several TCs working on a project).
 - ii) Justice will fill out an MTG form and send it out.
 - iii) Committee will issue a 15 page report hopefully with the recommendations. Do we want to come up with a residential standard? They will make a recommendation.

3) New Business

- a) TC 9.3 Size of a research project 1262 RP: multi-year research project, \$2.4MM worth: Measuring various variables in airplanes relative humidity, temperature, CO₂ and 200nm particles. Trying to correlate. Includes particulates and gases.**

4) Information Exchange:

- a) AFS – KJ Choi**
 - i) 2016 AFS Fall Conference “Clean Air and Water Solutions”
(1) October 24-26, DoubleTree San Diego Mission Valley
 - ii) 2017 AFS Spring Conference “Advanced Filtration Technologies”
(1) April 10-13, 2017, Galt House, Louisville, KY
- b) CEN/TC 195 – Air Filters for General Air Cleaning – Paolo Tronville**
 - i) Met as plenary meeting in Milan (March 18, 2016).
 - ii) They have decided to replace EN1822. Four parts will be withdrawn (2 to 5)
 - iii) Part 1 will be revised and will not be replaced immediately.
 - iv) 29436-1 is being revised now. Hopefully will be aligned with EN 1822-1.
 - v) EN 1822 cannot be deleted completely because of SOPs for pharmaceutical companies.
 - vi) Second point: Need to address request from EU commission on mandate 537 related to eco design directive. Mandate requests from CEN to provide support to establish an energy efficiency rating system for non-residential units. CEN/TC 195 set up a task group and is preparing a document that was sent to EU commission. As of now, the aging procedure of air filters for general HVAC is not suitable to predict energy consumption. Waiting to hear back from EU commission. May exclude filters from eco directive, or want to include and help. Deadline was very close, asking to complete work by July 2017.
 - vii) Had a few web-meetings.
- c) Eurovent – Paolo Tronville**
 - i) Paolo did not attend last meetings. But they are working on alignment of recommendation of energy labelling with ISO 16890.
 - ii) Eurovent summit End of September in Poland.
- d) IEST – Institute of Environmental Sciences and Technology – Vijay**
 - i) Membership has decreased from 4000 to 700.
- e) INDA – International Nonwovens Development Association – Tom Justice**
 - i) New conference chair: Marc Anttila

- ii) Filtration 2016 will be held November 8 to 10 in Philadelphia
- f) **NAFA** – Stephen Nicholas
 - i) Indoor conference in San Diego (second week of September)
 - ii) Spring meeting in Louisville (week before AFS)
- g) **ISO TC 22/SC 34/WG 3 & WG 11** – Paolo Tronville
 - i) Bruce: WG 11: Crankcase filtration (liquid coalescer) 4 or 5 parts. 2 have been published.
 - ii) WG 3: engine air cleaner testing , cabin air filter testing.
 - iii) ISO fine test dust: working on adding submicron NaCl to the test method. Submicron media test.
 - iv) Submicron soot aerosol: struggling with production methods (instruments are very expensive, dry soot and wet soot) Soot generator are big enough to test small engine air cleaners. Submicron loading.
- h) **UL 900** – Randall Haseman
 - i) Past 6 months: no revisions. Anybody can make a proposal to change UL900 to the standard technical discussions.
 - ii) Gage RR study: A few hiccups, but testing should be done within the next few months.
- i) **IAQ Meetings** – Jeffrey Siegel
 - i) They will move in with ASHRAE meetings.
- j) **Filtech Expo and Conference**
 - i) Will be held in Cologne, Germany October 10-14.
 - ii) Largest worldwide filtration full. Still have a few booths (10 or 15) available. Technical program already available.
- 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
- m) Nano conference by NC State and INDA
 - i) Raleigh, NC
- n) Asia Filtration Show
 - i) Dec 6 to 9 in Shanghai
- o) World Filtration Congress
 - i) WFC 13 has been awarded to San Diego 2020 April 20 to 24

5) **Adjourn – 6:00 pm**

Addendum E

TC 2.4 PROGRAM mtg Tuesday 6/28/2016 10:00 – 11:00 (room ACCC 120, 1st floor)

22 attended the subcomm mtg 1 WORKSHOP was accepted for St. Louis (53 attended!) "Are Rumors of MERV's death Exaggerated?"

<p>The Vegas conference seeks programs on new tracks that address the changes in technology:</p> <p>Conference Program Chair: Leon Shapiro Email: leonshapiro@gmail.com</p> <p>Track 1: Fundamentals and Applications Track Chair: Chuck Curtin Email: curtin@hvtz.com Engineering fundamentals are the foundation to understanding modeling, design, construction and operation of HVAC/R applications. This track provides opportunities for papers and presentations on theories, models, designs and shared experiences for both theoretical and applied concepts.</p> <p>Track 2: HVAC/R Systems and Equipment Track Chair: Michael Coltrin Email: Michael.Coltrin@parsons.com Selection of equipment and design of systems is critical for effective HVAC/R operation, and for achieving building operators' goals. The papers and programs in this track will assist designers and building operators in the use of traditional, non-traditional and hybrid equipment and systems, with an emphasis on high performance, sustainable and LED-certified buildings.</p> <p>Track 3: Water-Energy Nexus Track Chair: Gary C. Davies Email: gda@hvtz.com The interdependencies between our water and energy systems are clear and are becoming more pronounced as development requires the use of more resources while over-use and climate change make some resources scarcer. On the macro level, water is used in all phases of energy production and electricity generation (including renewables), and energy is required to extract, convey and deliver water, and to treat wastewaters prior to their return to the environment. On the micro level, the water-energy nexus is a major consideration for the HVAC/R community in determining equipment and system selection and design as well as building operation. This track will present papers and programs highlighting recent research on this issue as well as technologies and design intended to reduce the gap between energy and water efficiency.</p> <p>Track 4: Commercial and Industrial IAQ Track Chair: Kevin Marple Email: kmarple@benzoco.com Indoor Air Quality is a vital consideration in the built environment. As people spend increasingly more time in industrial and commercial facilities, IAQ is closely linked to occupant comfort, satisfaction, productivity and health. This track will offer papers and programs to inform building owners and operators on the value of improving IAQ.</p> <p>Track 5: Mission Critical Design and Operation Track Chair: Carrie Aze Crawford Email: carrieazeford@benzoco.com As societies become more dependent on mission critical facilities, the design and operation of these facilities has undergone rapid change. This track will present papers and programs which will highlight changes in technologies, controls, design and operation of mission critical facilities to meet their increasing loads while also maintaining their impact on energy/water usage.</p> <p>Track 6: Effect of Climate Change on HVAC/R Track Chair: Robby Alameddini Email: r.alameddini@pplb.com Climate change will have an increasing effect on the design and operation of the built environment. How does the HVAC/R community design for buildings today that are intended to be highly functional and efficient well into a future where today's standards, codes & practices may not be sufficient to meet tomorrow's climatic conditions? This track seeks papers and programs that will inform the selection of strategies, designs and approaches that will increase building resilience and facilitate climate adaptation.</p> <p>Track 7: Energy Efficient Industrial Buildings Track Chair: Corey Metzger Email: corey.metzger@resource.com Industrial facilities often have different HVAC/R requirements than do commercial and institutional facilities. Oftentimes these are a result of the processes that occur within industrial facilities as well as the life safety features these processes create. This track will present papers and programs that will inform how energy efficiency can be achieved without compromising life safety considerations.</p> <p>Track 8: Building Operation and Performance Track Chair: Cynthia Moreno Email: cindy@tmmedical.com Modeling has become an essential factor in the design of all aspects of many buildings. Often the operational results of the building do not match the modeled outcome that the owner/operator expected. This can lead to much "finger pointing" or worse. This track will present papers and programs to update modelers, designers, contractors and owners/operators on how to better match building performance with modeled expectations.</p> <p>Track Support: Tiffany B. Cox Assoc. Manager of Conf. Programs Email: tcox@benzoco.com For information on the technical program, social events, special sessions & general conf. inquiries</p>	<p>Workshops need Learning OBJECTIVES written (Includes Bio, Learning Objectives and Methods of Assessment).</p> <p>Las Vegas seminar & forum & Workshop proposals (abstracts) deadline = AUG. 8th</p> <p>Conf. PAPERS for Vegas due July 8th!</p> <p>Conf. Papers for LONG BEACH due Aug 29th! regular abstracts start Jan 2, 2017</p>
--	---

>>>> **Workshop 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 LAS VEGAS =		Jan 28 - Feb 1, 2017		NOTES
TYPE	TITLE	CoSponsor	Chair	
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	RESUBMIT??
Seminar	How have we set a separate test standard for Residential Filter Shipping (Title: "The Filter Standard") (Speakers: Brian Krafthefer and Brent Stephens/Jan Walker)	2.4	Tom Justice	??
Seminar	Do you know what you are breathing: Room Air Contaminants	2.4, 2.3	KJ Choi --John Zang, Thad Ptak, ___Ying___Lilew Odors	RESUBMIT
Workshop	SPC 199 is out; what does it mean? (MoT for Rating the Performance of Industrial Pulse Cleaned Dust Collectors)	2.4, 5.4, SPC 199	Bruce McDonald(?)	ask Bruce @ TC
Type	Title	CoSponsor	Chair	notes
Seminar	Gambling with your Filter co\$ts? What you don't know can Co\$ YOU. (Steve Nicholas' talk/paper: "Hidden Energy co\$ts right before your eyes")	2.3, GPC 35	Geoff Crosby or B. Krafthefer?, Steve N, VJ Geoff & Paolo T (Int, later)	ask Geoff @ TC
Seminar	YOU GET YOUR AIR: PARTICULATE MATTER, MATTERS! (possible health effects of ultrafines: Bill Bahnhoff(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)	2.3?(ozone), EHC?, IEQ-GA	Marilyn Listvan	or Long Beach? (check W speakers)
Forum /Workshop	Guideline 29 (Building Security, Chem Bio)	11321 (looking for 2.3, 2.4 cosponsors)	Scott Campbell	ask if still on
Seminar	Nanomaterials & their effects (looking for speaker @ 2.4; control means in exhaust... Vijay for HEPA/ULTRA or RTI's Kathleen for Nanofiltration)	EHC, 2.4 cosponsor	Lan Chi Weekes (EHC)	ask Vijay?
Newer Ideas - Long Beach (June 24-28, 2017 at Hyatt Regency) demonstrate the benefits of Net Zero Energy/ how to achieve NZE				
Seminar	Smart Filters (Sensors & Filter Operations) (Brian, Brent & Michael??)	2.4, 2.3, 62.2, 62.1	Brian Krafthefer	
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 ??	ask if still on
Workshop	The Chamber Brothers sing about Future Filtration Needs (Fines & Ultrafines??/ VOCs)	2.4 & 2.3 & 52.2	Bob Burkhead/D. Thornburg	
Proposed for BEYOND Long Beach =				
Conf. paper (Abstract due tbd)	How can Filters be rated by their PM (PM1, PM 2.5, PM 10, etc.) performance? (Thad Ptak, Bret Stevens?, Michael Waring?, Bruce McDonald)	52.2??	Don Thornburg, Brent Stephens / Michael Waring	
Tech paper(s)	Climate Degradation effects on Filtration???		Brian Krafthefer?	

- A Tim Johnson
- T Volker Haefliger
- T Kyung-Ju (KJ) Choi
- E Gemma Kerr
- N Lei Wang
- D John Simenson

- Len Duello
- Anja Coenen
- Don Thornburg
- Paolo Tronville
- Kate Cerully
- Michael Corbat