

MEETING MINUTES
TC 2.4 PARTICULATE AIR CONTAMINANTS AND PARTICULATE CONTAMINANT
REMOVAL EQUIPMENT
Tuesday January 20, 1998
San Francisco, CA

The meeting was called to order by Chairman Chuck Rose at 3:32 PM. Agenda and sign-in sheets were distributed and are attached and made part of these minutes (see Attachment #1).

Gene Valerio announced that Dave Murphy is having major health problems and that a get well card is circulating.

Upon a motion duly made and passed, the minutes of the Boston meeting were approved as mailed. Vote 17 - 0 - 0 - 2 = 19. It was noted that the Particle Party attendance list from the Boston event was missing from the minutes (Matt?)

John _____, our Handbook Liaison, briefly announced that he had sent the wrong chapter, 13B instead of 12.

COMMITTEE REPORTS:

Membership Subcommittee Report - Tom Justice-Chair

Subcommittee chair, Tom Justice reported that the June 11, 1997 copy of the membership is still is **incorrect** and should not be used. He will make the necessary correction with ASHRAE Headquarters and have the corrected roster mailed. He called out the official voting members and their membership dates. Two membership slots will be open after the June '98 meeting.

Call of the Roll was then taken. By verbal confirmation - 17 in attendance, 2 absent = 19. Bruce MacDonald had sent a letter indicating his absence, Bob Burkhead was called away just before this meeting.

Program Subcommittee - Bob Burkhead-Chair

Chuck Rose reported for the subcommittee. Copies of the Program Subcommittee report were then distributed. A copy is attached and made part of these minutes (see Attachment #2).

Mr. Rose reported that the following forums and seminars were presented at this (San Francisco) ASHRAE meeting sponsored by TC 2.4;

- | | | |
|-----------|---|------------|
| Seminar 5 | “Fine Particle Measurement for IAQ Investigations.” (Part 2).
Pat reported that ~150 people attended the session, (up from Part 1 of about 90). Pat reported she received positive comments encouraging the continuation of the series with Part 3. She already has 4 potential speakers lined up. | Pat Keady |
| Forum 36 | “Should Microbial Sampling be Performed during IAQ Investigations?
If so, when?”
(scheduled for 8 a.m. Wednesday, 1/21) | Matt Klein |
| Forum 44 | “New ASHRAE Standard 52.2: What is It?”
(scheduled for 10:15 a.m. Wednesday, 1/21) | Chuck Rose |

Chuck Rose then reported on the proposed items **Proposed and Rated for Toronto 1998;** (vote indicated)

Seminar	- "Antimicrobial Efficacy in Filtration Products." (but only 1 out of original 6 speakers has accepted so far, need other media-types for the results)–may postpone for Chicago	Mike Murphy	1 (10/17)
Forum	- "What's Dirt Got to do with it? The Need for a New Filter Test Dust."	Bob Burkhead	2 (7/17)
Forum	- "Conversion of Particle Number to Mass Concentrations: Should it be done?" (joint with GPC-17P)	Mark Krzyzanowski	3 (6/17)
Forum	- "Aggressive Microbial Sampling in IAQ Investigations: Is it Warranted? If so, when?"	Matt Klein	4 (2/17)

Proposed and Rated for Chicago 1999; (members voting twice for priority order)

Symposium	- "Defining Respirable Particulate."	Bob Burkhead	1 (10)
Symposium	- "Role of Odors on Indoor Air." (cosponsor with TC 2.1)	Bill Cain	2 (8)
Seminar	- "Effects of Revised Airborne Particulate Standards." (postponed from Toronto, since time conflict of Chair)	Dave Ensor	3 (5)
Seminar	- "EN779 Update Standards" (title to be revised)	Eric Kuiper	4 (4)

Proposed for Seattle 1999;

Seminar	- "Particle Research Frontiers Around the World."	Chuck Rose	
Forum	- "Prediction and Verification of Particle Concentrations in Buildings."	Frank Vaculik	

Proposed for Seattle or beyond;

Seminar	- "Ratio of Indoor & Outdoor Particulate Concentrations."(GPC-17)	Pat Keady	
Symposium	- "Particulate Measurements for IAQ Studies."	Pat Keady	

Proposed for Dallas 2000;

Seminar	- "Prediction and Verification of Particle Concentrations in Buildings." (??, depending on results of Forum)	Frank Vaculik	
---------	---	---------------	--

Matt Klein encouraged everyone to make an effort to prepare/present more Symposia, since the written papers then become part of the permanent record for research, etc. Note that while it is easier to just make a Seminar slide presentation, you have prepared half of the paper already, and can finish it for the review process.

Research Subcommittee Report - Chairman Mark Krzyzanowski

Subcommittee Chairman Mark Krzyzanowski distributed minutes from the subcommittee along with a sign-in sheet from TC 2.4 Particle Research working group. A copy is attached and made part of these minutes (see Attachment #3).

He then reported on the following projects;

675-RP "Determination of Air Filter Performance Under Variable Air Volume (VAV) Conditions. "

A formal final presentation was made by Richard Rivers, representing the contractor, on Sunday at the subcommittee meeting. Major points are in the subcommittee minutes. The final project was accepted by the subcommittee as closed, contingent on a formal paper being prepared for a future ASHRAE meeting.

759-RP “Identification and Effectiveness of Current Methods Applied and Criteria Applied in Non-Routine Cleaning and Decontamination of Air Ducts and Other HVAC Components.” The PMC received and accepted a revised Phase 1 final report from the U of Minnesota contractor. They also provided a presentation summary of the changes to the final report. The subcommittee recommended that the final report be accepted, contingent on making some minor editorial changes (including the title, and recommendations for future work). Chair Krzyzanowski moved and was seconded to accept the revised final report. **TC 2.4 Vote: 15-0-2-2.**

Note: All ASHRAE project final reports are obtainable through ASHRAE (Bill Seaton) for a donation of ~\$30. You should not ask the contractors, but go through ASHRAE for these.

759-RP Phase 2 The direction and scope of Phase 2 has changed, based on Phase 1 results. A 3-page work statement has been prepared for this. “Identification of the components of debris resident in air handling systems-pilot study” (Attachment #4) Chair Krzyzanowski moved and was seconded that the 3-page work statement be approved for funding and submitted to RAC. The PMC chair will work out any changes to the PMC membership. Some discussion of whether to include viable microbiological analysis followed (see ~~strikeout~~ in section D: Objectives in attachment 4). Karin’s friendly amendment to the work statement was accepted. **TC 2.4 Vote: 14-2-1-2.**

759 Phase 3 Possible phase 3 work will be considered at a later date.

760-TRP “Efficiency of Air Cleaners in Removing Biocontaminants from Elementary Grade School Classrooms.” The 3-Page work statement was approved but revised in Boston, and final version is now complete for RAC submission. Copies were available from Mark.

776-TRP “Investigate and Identify Means of Controlling Viruses in Indoor Air by Ventilation or Filtration in the HVAC System.” Due to the high cost of the project, the PMC re-examined the scope, but couldn’t logically descope. The PMC recommended drop the project from the research plan. No objections.

961-RP (804-TRP Phase 2) “Identification of Contaminants, Exposures, Effects and Control Options For Construction/Renovation Activities.” Have proposals from 3 contractors. The bidders were asked to leave the room. The PMC and the Research Subcommittee recommended InAir Environmental as the contractor. **TC 2.4 Vote: 15-0-2-2.** (Note TC 2.3 voted 11-0-2-0 = 13; all in favor). This approval is contingent upon the further ASHRAE committees that need to give their approval of this recommendation.

909-RP “Determine the Efficacy of Anti-microbial Treatments of Fibrous Air Filter.” A summary was given by Al Veeck, chair of the PMC. A verbal report had been given to the subcommittee by Karin Foarde of RTI. The project is ahead (lab) or on (fieldwork) schedule and within budget. A request was made by the PMC to increase the scope of the project by adding a second filter media type (synthetic ring panels vs. currently testing pleats) for the project for both lab & field experimentation to test if efficacy is effected by media characteristics. The current project cost is \$79,825; the additional scope (essentially doubling the project) would cost \$52,536. The Research subcommittee had ultimately approved this request after some discussion of proper

channel for this funding request (justified by reduced cost, efficiency and comparable results).
Note: Barney Burroughs concern of why not test high end of filter quality rather than lower end quality filter. PMC chair Veeck replied these were the most prevalent filter types in the hey-day of buildings with single racks.

Chair Krzyzanowski moved and was seconded that the additional scope be approved for funding and submitted to RAC. **TC 2.4 Vote: 14-0-3-2.** The PMC will provide a letter of justification and request for funds to RAC.

- 1996-1997 Research Work Plan (Project leftover)

2-Star Rated “Develop a New Loading Test Dust for ASHRAE Filter Test Standard 52.2 to Reflect Known Effects of Atmospheric Dust Loading on Air Filter’s Particle Removal Efficiency in Actual Service Conditions.” PMC Chair Bob Burkhead has met with the PMC this meeting and is about half-way done with the 3-page work statement and has committed to sending it out (to TC 2.4 members) for letter ballot over the course of the next few weeks to include in the next funding cycle. The project is critical for SPC 52.2, so watch for the ballot to keep the project moving forward.

Note that ASHRAE has dropped the star rating system for research projects; the new system is either priority-rated or non-priority rated (by R&T). After the summer meeting of prioritizing, only the top 5 go forward and their 1-pagers are submitted. The 3-pagers are needed for the winter meeting or the project will go back in the re-prioritizing hopper.

- 1997-98 Research Work Plan

(#1 Priority) “Measurement and Filtration of Ultra-fine Particles <0.3 um.” A revised 3-page work statement was completed by changing “general ventilation filter” throughout to “building air filter”. Greg Thiel added that TC 5.4 would cosponsor. Chair Krzyzanowski moved and was seconded that the revised work statement be approved for funding and submitted to RAC. **TC 2.4 Vote: 16-0-1-2.** Chair Krzyzanowski commented that the category for this project would be changed from “IAQ Comfort & Health” category to a “High Risk – Innovative Emerging Technologies” category. (Note that TC 5.4 Vote: 7-0-0-3 = 10.)

Research subcommittee chair Krzyzanowski then introduced Al Woody, the ASHRAE Research Liaison to explain and comment on the High Risk category. There is also a Technology Transfer category(e.g. collecting data, putting it in databases, etc.). Al indicated he would be willing to review any work statements, and that TC 2.4 is doing an excellent job of submitting work statements (which are due 2/15).

His address is:

Al Woody, Chief Engineer, Giffels Assoc. Inc.

awoody@giffels-usa.com

25200 Telegraph Road, P.O. Box 5025, Southfield, MI 48086 – 5025

Phone (248) 936-8610 fax 936-8611

(#2 Priority) “Investigate and Determine Physical Mechanisms that Diminish (Impact or Reduce) Filtration Efficiency of Charged Fiber Media.” A change in chair from Bob Raber to Eric Kuiper. The 3-page work statement is being revised and will be sent out by letter ballot.

- 1998-1998 Research Work Plan

Mark reported that 10 projects were submitted to R&T (8 one-pagers were complete). However, none received priority ranking from R&T. The top 5 are:

- #1 “Round Robin Interlaboratory Testing of Filters Under ASHRAE Standard 52.2 to Determine the Adequacy of the Apparatus Qualification Tests,” [Jim Kubokawa - PMC chair; McDonald, Thornberg, Hanley, Kuiper, Hseih, Raber]
- #2 “Investigate and Determine Physical Mechanisms that Diminish (Impact or Reduce) Filtration Efficiency of Charged Fiber Media.”
- #3 “Measurement and Filtration of Ultra-fine Particles (<0.3 micrometers).” [Pat Keady - PMC chair; Rose, Hanely, Hseih, Kuiper with TC 5.4]
- #4 “Determine the Relationship Between Particle Source (Generation) and Control Methods, with the Development of a Model to Help Design Control Methods for Acceptable Particulate Levels Indoors via Controlled Experimentation.”
- #5 “Investigate and Determine Correlation of Indicated Particle Size as Measured by Optical Particle Counters to True Aerodynamic Particle Size”

The #1 priority project above has a 3-page work statement completed and SPC 52.2 requested that this project move forward (as imperative). Chair Krzyzanowski moved and was seconded the PMC’s recommendation that the work statement be approved for funding by RAC. **TC 2.4 vote: 16, 0, 1, 2.**

- 1999-2000 Research Work Plan

Will be prioritized in Toronto; Chair Krzyzanowski commented that the list is long and the competition will be tight. Come to the Research meeting to defend your projects.

Note: A paper detailing the cohesiveness of the research plan is a new requirement for ASHRAE.

- Some new work statement proposals were discussed:

1005-URP “Air Cleaners for a Better Environment, Phase 1”, submitted by Delft University which was rejected in the original form at the Boston meeting, has been revised and the new draft is available from ASHRAE for informal review. Additional reviewers are requested [Krzyzanowski – PMC chair; Vaculik, Montgomery, Kuiper, Thiel and Klein].

Proposal received in Boston with a request from SSPC 62 for TC 2.4 to co-sponsor the following research project, “Determination of the Volume of Air per Cigarette Necessary to Dilute ETS, the Resultant ETS Specific Marker Concentrations and the Variability of Same to Provide Acceptable Perceived Indoor Air Quality for Adapted and Unadapted Smokers and Non-smokers.” Derald Welles had no update, but Mark Huza reported that EHC research has dropped this project with their new research subcommittee chair, even though it was previously EHC’s #2 priority project and the only one with a 3-pager. TC 2.3 will look at this project again and Mark Huza will try to work with EHC again as well.

- New business (Research)

Chairman Krzyzanowski reported one new suggested project: “Efficacy of UV on Bioaerosols as Part of the Filtration System” (High Risk Project) Derald Wells has completed the 1-pager and will get it to Frank Vaculik.

-- Dissemination of Research Results

Chairman Krzyzanowski reported that concerns were raised on what happens to results of RPs at the end of the project, i.e. So What?? How do we get the word out? A suggestion to have the contractor prepare a 2-page “plain language” results executive summary to disseminate to ASHRAE Journal or Insights, ASHRAE Web

page, press release etc. Why was project done, what were the goals and subsequent results. (and a note at the bottom “if you want the full report...ASHRAE”) RAC liked the idea and we may take a recently completed project as an example (e.g. 759 Phase 1) MK, Hal Levin and Frank Vaculik will work this. R. Rivers noted that 675 has already has a 3-page executive summary completed which could also be used.

Standards Subcommittee Report - Chairman John Sabelli

Subcommittee Chairman Sabelli reported on the meeting held on January 19. There were 19 people present.

Revision of **ASHRAE Standard 52.1** “Gravimetric & Dust Spot M.o.T. Air Cleaners” has been authorized. Call for interested parties was in 12/97 Journal.

C. Rose then gave a report on **SPC 52.2P** M.o.T. Air Cleaners for Particle Size Efficiency. The 3rd public draft of the standard was approved for publication (with some editorial revisions). Publication is expected in June 1998.

GPC 17 - Sampling of Airborne Particle Concentrations. They continue to move ahead with their draft. The group is still waiting for an official roster of membership, hopefully soon so they can go to public review.

CEN activities: TC 195 WG 1 is working on EN779 draft; plan to publish in 1999. This is the European version of particle size efficiencies. Round robin testing going well now. Group 2 is working HEPA/ULPA filters EN1822. Parts 1,2 & 3 have been accepted; parts 4 & 5 draft are finished, under review.

UL: No update on UL 900. UL 2117 was briefly discussed – 2 hour presentation will be made at Indoor Environments in Washington, DC in April 98.

EPA: ETV (Environmental Technology Verification) program on air filters looking at 52.2 method. The next stakeholder meeting is 2/17/98 at the Key Bridge Marriot in Washington, DC. Is in pilot phase.

ASCM is working on a vacuum cleaner efficiency standard (particle size standard); have draft 8 and are working on draft 9 presently.

TC 5.4 is doing research work to setup a guideline on using recirculated project air, especially for industrial use. They have a priority rated project on testing methods.

SAE: Automotive cabin air is in round robin testing now; duct loading of the filters – hoping to be complete by end of 98. They are also starting some gaseous air contaminants round robin testing.

TC 9.11 (Clean spaces) has re-formed ; was a TG for several years.

SPC 161 Aircraft Cabins: Larry Holcomb noted they are discussing bioaerosols and the very low levels of fungi & spores, etc. that are in aircraft cabin air. Are considering standards or for air quality “in the breathing zone”, rather than a ventilation standard.

SSPC 62 – Mark Huza reported. 62.1 will be the standard for commercial and high-rise residential buildings and 62.2 will be the residential standard (Barney Burroughs is on this committee, and those issues will not be covered here). 62R was pulled by ASHRAE’s Board of Directors after working 7000 comments. Standard 62 1989 is now in continuous maintenance and 62.1 is responsible for that.

62.2 is tasked with: a) writing a new standard as a code and not simply as code language (i.e. with no supporting or informative documentation); b) Oversee development of a users manual(which would be prepared under contract to ASHRAE); and c) Develop guidelines to go beyond the code, which is the minimum requirements.

Note: Continuous maintenance means anyone is allowed to send in a recommended change on the proper form

that the committee (62.2) can respond to or decide whether the change is appropriate. Anyone can also send in a letter “request for interpretation” (i.e. what is meant by _____)

There was a request for interpretation that affects members of TC 2.4: The standard is ambiguous; it defines quantity and quality of ventilation air to provide acceptable indoor air quality – but the question was what if outdoor air is above acceptable limits, the standard (6.1.2) says “it should be treated for contaminants” in... not it shall be ... So the standard is a recommendation, not a requirement for IAQ. But the committee did NOT agree with that interpretation of a recommendation; but the committee is implying that if outside air is unacceptable, then the indoor air quality might not be acceptable either. (But that the committee would try to resolve ambiguities.)

Note also that an amendment has been submitted (by the chair of the committee) to remove all references to requirements for outdoor air filtration. {Rational for the change is that 1)“ Outdoor air contamination is a societal issue, and it’s cost to clean should not be treated as a cost of doing business to the building owner; 2)There is no cost-effective means of reducing carbon monoxide levels to acceptable limits when they exceed whatever the requirements are; 3)It is impractical to accommodate higher filtration efficiencies with small package units, such as smaller roof-top units and p-tap equipment; 4)Natural ventilation systems cannot be accommodated using higher efficiency filtration systems that might be needed.”}

Any changes are supposed to happen by informing the materially affected parties and giving them a chance to prepare comments/response. This agenda, however, was distributed only 4 days ahead, giving TC 2.3 and TC 2.4 no chance to respond. Mark Huza was able to postpone the vote on this by a point of order until the April meeting of 62.1. He will have one hour to present the case for filtration. Committee 62.1 also requested a white paper be written, presenting the case for filtration, covering these points:

- Cost/benefit analysis related to filtration
- Effects of higher efficiency filtration on small package units
- Potential liability of NOT filtering air
- Maintenance and operation issues (how easy is it to maintain & operate contemporary filter units)
- CO filtration criteria
- What are the limits of partially polluted outdoor air (how much “badness” is acceptable for ventilation)
- How can natural ventilation systems can be accommodated when higher efficiency filtration is used

Mark Huza requested that TC 2.3 and TC 2.4 participate in the development of this white paper and also as many members as possible also attend this next 62.1 meeting the last weekend in April, somewhere in the Chicago area. (To provide more broadly-based support of these issues). He reported that members of the 62.1 committee represent themselves, not their companies, but that industry groups may get some voting memberships as well (e.g. tobacco industry, BOMA, Home Builders Assoc., etc.).

Action requested: NAFA should formally request a voting position on 62.1 (and Al Veeck, President of NAFA, so noted that request).

Action requested: There is also an opportunity to appoint a Liaison from TC2.4, not a voting position, but an information conduit back to TC 2.4. Mark stated that he has been serving as the informal liaison, but would like another person, again to provide more presence in 62.1 meetings than just he and Barney Burroughs. Need to have TC 2.4 write a letter to the manager of Standards requesting that the liaison position be made.

In 62.1, another amendment was voted on and approved: to modify the footnote in Table 2 – to delete the words “a moderate amount of smoking”. Footnote did read “The ventilation rates that are listed in Table 2 accommodate a moderate amount of smoking”. The rational was that the EPA has classified ETS as a Class A carcinogen.

Larry Holcolm noted that this footnote change was being taken up with the Standards Committee on 1/21.

Mark summarized his concerns by indicating that the direction that 62.1 was going would be to dramatically diminish the effects of the value of filtration within ASHRAE ventilation standards. Unless members of TC 2.4 are proactive right now, our position as engineers giving engineering solutions to these ventilation problems will be greatly diminished.

Chuck Rose noted that some members of TC 2.3 had volunteered to help with the white paper and the possibly the presentation: Gene Valerio, Chris Muller, Jim McKay & Bob Raber.

TC 2.4 volunteers are: Al Veeck, K.C. Hsieh, Gene Valerio, Charlie Siefert and Larry Holcomb.

Mark Huza will be the focal point.

Because of the tight time frame Mark Huza's email is: mhuza@ffi.flanderscorp.com

Action Requested: A request for Liaison was made. The meetings are 4 times a year, 3 days each. Two of the meeting are concurrent with ASHRAE meetings. No one immediately volunteered, need information on time & travel requirements.

Marilyn Listvan moved and was seconded to support Mark Huza's request to prepare a one-hour presentation to the SPC 62.1 committee on behalf of filtration needs on behalf of TC 2.4. **TC 2.4 vote 17-0-0-2.**

Publications Report – Marilyn Listvan

As was earlier stated in the Research report, we need to publish more papers. Note that Insights has a Tech Column, which would not be a large effort. ASHRAE Journal October issue is on IAQ, deadline for papers is 3 months prior.

Handbook Subcommittee Report - Chairman Derald Welles

Subcommittee Chair Welles reported. Chapter 24 Systems and Equipment: Need to finalize the draft; final publication is in January for the 2000 Handbook. Has only gotten back 2 sets of comments on over 20 copies sent out.

We are also coordinating on two chapters with TC 2.3 for Fundamentals, to be published in 2001. The chapters are: Odors and Air Contaminants. Draft copies were handed out with many changes that were developed last time, but too late for inclusion --- so much of the revision is done, need reviewers. Wants comments back to Gemma Kerr by the end of February. Derald will prepare a list of reviewers.

Information Exchange: (EPA, NAFA, AFS, AIHA, ASTM, etc.) Did not occur due to time constraints.

New Business:

A Website had been suggested for the TC 2.4. Will postpone until next meeting. Matt Klein remarked that ASHRAE is coming up with guidelines for Websites, which are not ready yet. Think about it for next meeting. Marilyn Listvan noted that one of the issues was that you could not use a commercial site as a server (or you would have links from an ASHRAE site to a commercial site). Will add this as an agenda item.

Pat Keady noted that she had a few copies of 2 of the speakers viewgraphs from her Seminar session: "Characterizing Personal Exposures to Fine Particulate Matter and Their Relationships to Indoor and Outdoor Concentrations," Barbara Turpin of Rutgers U., presenter; and "Characterization of Indoor Particulate Sources in Homes in the Boston Metropolis Area," Eileen Abt of Harvard School of Public Health, presenter.

A motion was made for adjournment. The meeting was adjourned at 6:05 PM. The Particle Party will be at New Joe's restaurant (arrangements made by Bob Swezey)

Submitted by:

Marilyn Listvan, Ph.D.
Secretary