

# ASHRAE Technical Committee 4.3: Ventilation Requirements & Infiltration

2017 Annual Meeting

## AGENDA

Monday January 22, 2018, 4:15 pm-6:30 pm  
Adams (6/F) Palmer House

### 1. COMMITTEE AND MEETING INFORMATION

Subcommittee Meetings:

Research: During Main Meeting  
Program: During Main Meeting  
Handbook: During Main Meeting

**Scope:** TC 4.3 is concerned with ventilation requirements and the analysis of infiltration, airflow around buildings, and exhaust re-entry, including their integration with indoor air quality and energy calculations for building and HVAC system design and operation.

TC Web Site: <https://tc0403.ashraetcs.org/>

### 2. CALL TO ORDER

Voting Members				
	Name	Position	Company	Roll Off June 30
1	Josephine Lau	Chair	Univ of Nebraska-Lincoln	2018
2	Martin Stangl	Vice-chair	RWDI	2019
3	Jordan D Clark	Secretary	Ohio State	2021
4	Steve Taylor	Research	Taylor Engineering	2021
5	Ed Light	Member	Building Dynamics	2019
6	Mini Malhotra	Program / Membership	Oak Ridge National Laboratory	2019
7	Nathan Ho	Member	P2S Engineering	2020
Non-Voting Officers				
	Steve Duda	Honors	Ross & Baruzzini, Inc.	-
	Brian Rock	Handbook	The University of Kansas	-
	Xia Fang	Webmaster	McKinstry	-

Quorum > 1/2 all VM, excluding NQM; super majority >= 2/3 VM present; simple majority > 1/2 VM present

### 3. APPROVE AGENDA

Taylor moved, Clark second, 5-0-1

### 4. APPROVE MINUTES FROM PREVIOUS MEETING

Taylor moved, Ho second, 5-0-1

### 5. ANNOUNCEMENTS (TC CHAIR)

- Commitment to the ASHRAE Code of Ethics – (TC Chair): In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)”
- You can acquire a FREE badge at the ASHRAE Registration. This free badge will not gain access to the conference programs, but is a great way for people to identify themselves and improve their networking

## 6. LIAISON REPORTS

- a. Technical Activities Committee (TAC) (Dennis Wessel).
  - 1) Problem with GoToMeeting, IT Contacted
  - 2) Roster online: make sure contact info is up to date for July roster changes
  - 3) Activity form should be filled out at each meeting
    - a) Somewhat complex- trying to simplify over next 6 months
    - b) Important nonetheless for quorum, etc.
    - c) TC MOP available on ASHRAE website
      - (1) Provisional members will be removed after 2 years- clean up roster
    - d) ASHRAE interested in Resilience
    - e) Ensure emails are correct in bio to receive emails
    - f) Minutes due 60 days after meeting
    - g) Program, seminar and forum abstracts due by Feb 9. Get requests in as early as possible
    - h) Program- 2019-2020 ASHRAE's 100<sup>th</sup> anniversary
      - (1) Looking for submissions of a historical nature See attached Appendix B
- b. Standards (Cecily Grzywacz).
  - 1) Not present
- c. Conferences and Expositions Committee (CEC).
  - 1) Not present
- d. Handbook Committee (Harris Sheinman).
  - 1) Not present
- e. Professional Development Committee (PDC) – (Donald Brandt).
  - 1) Not present
- f. Special Publications (Francis Mills).
  - 1) Not present
- g. Environmental Health Committee (Josephine Lau).
  - 1) Interested in IAQ procedure and air cleaning, especially in schools, marketed to reduce ventilation requirements
- h. Research liaison
  - 1) [RI4@ashrae.org](mailto:RI4@ashrae.org)- coordinate for research projects

## 7. SUBCOMMITTEE REPORTS

- a. Research (Steve Taylor)
  - 1) Research Subcommittee Meeting Chair Report
    - a) March 15 deadline added for RTARs and WS's in addition to three others

- b) \$3 million for research. This was on hold which caused 11 WS's to be held up, but they are going to be funded in the Spring
- c) PMS is not allowed to negotiate scope-must go through TC and RAC, will go beyond RAC if there is a money change
- d) Responsibility of PMS Chair to do disposition form and say project is complete

2) Active Research Project Status

Name	Project	PMS	Status
RP-1747	Implementation of RP-1547 CO2-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems	Dennis Stanke (chair), John Murphy Raj Daswani Heejin Cho	Complete. Very successful. Take off list

3) Pending Research Project Status

Name	Project	Champion	Status
<b>Work Statement (WS)</b>			
WS-1730	Pressure Coefficients and Pressure Drop for Standard Venting Strategies and Components in Residential Attic Spaces	TC 4.4 Anthony Fontanini Mike Ratcliff	Anthony has satisfied comments- v08, small changes made from original. TC 4.4 has not decided what to do. WS must be submitted to RAC after July Houston meeting. Anthony will send around current version which 4.4 is voting on.so we can vote to co-sponsor or not at the same time.
WS - 1819	RP-1547 follow-up for systems with multiple recirculation paths	Steve Taylor /Josephine Lau	Approved for bid
WS 1823	Improved Exhaust-to-Intake Dilution (Concentration) Calculations	Steve Taylor Iain Walker Brian Rock	Approved for bid
<b>Research Topic Acceptance Request (RTAR)</b>			
RTAR (Draft)	Characterizing the Performance of Entrained Flow Stacks	Brad Cochran	Approved on first pass. Need to understand velocity profiles of entrained stacks and effect on plume rise. Steve Taylor and Michael Ratcliff volunteered for PMS
<b>Multidisciplinary Task Group (MTG)</b>			
MTG	Idea of MTG around VOCs and VOC mixtures and what constitutes air quality.	Ed Light	Updated a MTG proposal. Will ask 4.3 for co-sponsorship, EHC to lead, working with IAQP committee Will help focus research on relationship between VOCs and ventilation (see attached file – Appendix A)
<b>New Ideas</b>			
	Moisture Generation Rates in homes	Iain Walker	RTAR in progress, Iain not present
New	Infiltration vs. Pressurization impact with ERVs	Josephine will try to find masters student	Tradeoff of reduced infiltration due to reduced exfiltration vs. energy recovery from exhaust air
New	Cost effectiveness of sealing between floors in multistory buildings to reduce stack effect	Marianne Tushi from University of Toronto	Marianne initiated conversation
	Cost effectiveness of code requirements to reduce multi-family internal partition leakage	Gren Yuill	both pollutant transport and energy conservation no update
	Outdoor particulate matter penetration and indoor PM removal rates in naturally ventilated commercial buildings	Jordan Clark	TC 4.3 and TC 2.4 voted to co-sponsor. Waiting on SSPC 62.1 to vote to sponsor
	Outdoor ozone in naturally ventilated buildings	Jordan Clark	TC 4.3 and TC 2.3 voted to co-sponsor. Waiting on SSPC 62.1 to vote to sponsor
	Fluctuating pressure conditions in single-sided natural ventilation	Jordan Clark James Lo	Will submit RTAR for vote before Houston conference
	Electric Vehicle effects on outdoor air	Steve Taylor	

Name	Project	Champion	Status
New	Impact of sealing, window replacement, overcladding multi-family units on ventilation rates	Marianne Tushi	Idea just initiated
<b>On Hold or Inactive</b>			
Hold	Is CO2 a pollutant or an indicator?	Steve Taylor	On hold. Will let existing research mature/evolve

4) Regular deadlines: March 1 (for spring RAC meeting), May 15 (for June meeting), August 15 (for fall RAC meeting), December 15 (for January meeting)

b. Program (Mini Malhotra)

1) Chicago program

City	Title	Type	Time	Chair/Speakers
Chicago	Controlling Pollutant Sources in Residential Buildings	Seminar 14 (Intermediate)	Sunday, January 21, 3:15 PM - 4:45 PM	<b>Chair: Steven J. Emmerich</b> Speakers: Paul W. Francisco Jeffrey Siegel Brett Singer Mike Moore

2) Houston Tracks

9 tracks-2 most relevant to TC 4.3 are Track 2 Fundamentals and Track 5 Modern Buildings in Hot and Humid Climates.

Steve Taylor: Got turned down on 1747 seminar. Will re-submit

John Carter: Should let new track chair know that a seminar was previously submitted if re-submitting

\*Topics, speakers, session types, etc. will be determined by the cognizant committee.

### **Track 1: HVAC&R Systems and Equipment**

### **Track 2: Fundamentals and Applications**

Track Chair: Dennis Alejandro

Email: [denzjac@yahoo.com](mailto:denzjac@yahoo.com)

Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

### **Track 3: District Energy and Cogeneration Plants**

### **Track 4: Safeguarding your HVAC&R System**

### **Track 5: Residential - Modern Buildings in Hot and Humid Climates**

Track Chair: Dimitris Charalambopoulos

Email: [dimitris@ashrae.gr](mailto:dimitris@ashrae.gr)

Residential dwellings require designers to consider a different scope of building functions, occupant use, and comfort. With increasing utility rates and a movement toward net zero housing, the traditional residential design models are continuously diversifying and evolving. This track will discuss how we can integrate modern residential design and building practices into hot and/or humid climates with specific challenges ranging from indoor comfort to ventilation and mold.

**Track 6: Professional Skills**

**Track 7: Research Summit**

**Track 8: HVAC&R Control Freaks**

**Track 9: HVAC&R Analytics**

3) New program ideas

City	Title	Type	Chair/Speakers
??	Controlling Pollutant Sources in Residential Buildings	Seminar 62.2 Co Sponsor	Steve Emmerich
Houston ??	Results of RP-1747	Seminar	Steve Taylor
??	Where has my air been?	Seminar	John C, Martin/Ron/? will re-organize for IAQ track and include information about separation distances
??	62.2 update	Seminar	Iain Walker
??	Assessment of VOC mixtures	Workshop	Ed Light (with MTG)

4) Regular deadlines: February 6 (for June meeting)

c. Handbook (Brian Rock)

1) Chapter status

Volume	Chapter	Lead	Status
2021 Fundamentals	Chapter 16 Ventilation and Infiltration	Jordan Clark	2017 version published
2021 Fundamentals	Chapter 24 Airflow Around Buildings	Ted Stathopoulos	2017 version published
Applications		Jason Urso	Due April 12 <sup>th</sup> , 2018

2) Base files: <https://www.ashrae.org/resources--publications/ashrae-handbook-central>

3) Base files: <https://www.ashrae.org/resources--publications/ashrae-handbook-central>

d. Standards (Steve Emmerich)

1) TC 4.3 Cognizant

a) 62.1 Ventilation for Acceptable Indoor Air Quality (Nathan Ho)

(1) Many changes to NV procedure, Ventilation Effectiveness, RTARs coming out

b) 62.2 Ventilation for Acceptable IAQ in Low-Rise Residential Buildings (Iain Walker)

(1) No update

- 2) Others Standards of Interest
  - a) 90.1 (Steve Emmerich)
    - (1) No update
  - b) 170-2013: TC 9.6: Ventilation of Healthcare Facilities (Rick Hermans)
- e. Honors (Steve Duda)
  - 1) See attached report in Appendix C
- a. Webmaster (Xia Fang)
  - 1) Not present
- b. Membership (Mini Malhotra)
  - 1) Provisional corresponding members please email Josephine if interested in being corresponding member

**8. NEW BUSINESS**

- a. MTG.ACR (Steve Taylor)
  - 1) Generated RTAR on hospitals, clean rooms and laboratories
    - a) Considered too broad
    - b) Taylor: Not clear that MTG is needed because not a lot of synergies between disparate areas
    - c) Ho: 62.1 has withdrawn interest because outdoor air rates are not part of scope
    - d) Taylor moved to withdraw 4.3 from MTG, Ho second, 5-0-1
- b. MTG.OBD (occupant behaviors) (Mini Malhotra)
  - 1) No update
- c. Future Meetings
  - 1) June 23-27, 2018 - Houston, TX
  - 2) Jan. 12-16, 2019 - Atlanta, GA

**9. ATTENDANCE**

- a. Please fill out attendance sheet.

**10. ADJOURN**

- a. Time: 6:58pm

Appendix A  
**MTG PROPOSAL FORM**

Return Form to:  
Manager of Research & Technical Services  
ASHRAE  
1791 Tullie Circle, NE  
Atlanta, Georgia 30329-2305  
☎ 404-636-8400 • Fax 404-321-5478  
E-mail: techserv@ashrae.org

*Date:* January 10, 2018 DRAFT

**MTG Name:** *Multidisciplinary Task Group on VOC Mixtures in Indoor Air*

*Contact:* Ed Light, CIH [Elight@Building-Dynamics.com](mailto:Elight@Building-Dynamics.com) (240) 899-6926

***Sponsorship Requested:***

EHC; TC 2.3 and 4.3; SPCC 62.1 and 189.1; GPC 27; TRG4.IAQP

**MTG Scope:**

1. Review literature on the incidence, effects and regulation of VOCs.
2. Prepare critical review of how ASHRAE standards address VOC mixtures.
3. Propose updated approaches to the assessment and control of VOCs.
4. Recommend research to improve understanding of VOCs.

**Impact on TC/TG/TRGs and Other MTGs:**

Facilitate:

- Standards updates (i.e., 62.1 and 189.1).
- RTAR proposals
- Guidance Documents

Note: ASHRAE Committees are currently considering changes to listed VOCs of concern. This continues does not fully consider current science and does not address overall IAQ.

***Supporting Rationale:***

Little information on low-level VOC mixtures was available when VOC provisions in ASHRAE Standards were developed. The science has progressed since that time, and could support more effective approaches to VOC assessment and control. Teaming of engineers with health scientists and chemists is needed to develop practical criteria consistent with current science. Questions which might be addressed by an MTG include:

General:

- Can conclusions be drawn from testing for a small fraction of VOCs in indoor air?
- Can a standard list of “Contaminants of Concern” be developed to assess and control overall IAQ?
- Are current Cognizant Authority contaminant criteria appropriate for use as IAQ standards?
- What research is needed for a better understanding of VOC mixtures with respect to health risks, ventilation rates, air filtration, etc.?

ASHRAE Standards:

- Can 62.1 ventilation rates be safely reduced with respect to VOCs?
- Are VOC tests appropriate for acceptance of high-performing buildings (189.1)?
- How should filters be classified with respect to VOC control?



**ASHRAE's Historical Committee**

**Announces Call for Papers for the Society's 125th Anniversary**

ASHRAE will celebrate the 125th anniversary of its founding during the 2019-2020 Society year.

As a part of the celebration, the Historical Committee has announced a call for papers on technologies and topics that occurred between the years 1920 – 2000. What do you consider are the milestone industry advances in heating, ventilating, refrigeration and air conditioning? How did they develop, who did it, how does it impact us now? HVAC&R engineering changed our lives! What did we engineers do? How did we do it? Your topic can be specific or broad, but let's document the history. Accepted papers will be published in ASHRAE Transactions and presented at a Society Winter or Annual Conference during the celebration year.

Abstracts are due March 2018. Upon acceptance, papers are due September 2018. Papers can be a maximum of 30 double-spaced pages in length and undergo a double-blind review.

To submit an abstract, go to [mc.manuscriptcentral.com/ashrae](https://mc.manuscriptcentral.com/ashrae).

For more information, contact Jeff Haberl, 979-845-6507, [jhaberl@tamu.edu](mailto:jhaberl@tamu.edu).

Instructions to submit an ASHRAE 125th Anniversary paper:

1. Go to: <https://mc.manuscriptcentral.com/ashrae>
2. Enter the paper details:
  - a. Title
  - b. Short 100 words or less promotional abstract
  - c. Select the publication subcategory of the Conference in which you prefer to present the manuscript: Atlanta 2019 or Kansas City 2019. The 2019 ASHRAE Winter and Annual Conferences take place as follows: Jan. 12 – 16 in Atlanta, GA and June 22 – 26 in Kansas City, MO > Save and Continue
  - d. Select 3 keywords
3. Enter the author and co-author information: To check if an author already exists in the journal's database, enter the author's e-mail address and click "Find." If the author is found, their information will automatically populate for you. > Save and Continue
4. Cover letter: Use the space provided to indicate "ASHRAE 125th Anniversary Paper"
5. File Upload: Use the file upload module to submit your review abstract in Word format.
6. Review the details entered and submit

<https://www.ashrae.org/membership--conferences/conferences/papers-and-programs>



### **TC 4.03 Honors & Awards Report**

#### 2018 Winter Meeting, Chicago, January 2018

Deadlines that occur *before* the next meeting (June 2018 Houston) are listed in **red** below.

#### *George B. Hightower Award:*

- *Recognizes excellence in volunteer service in the area of Technical Committee, Technical Group, and Technical Research Group activities, excluding Research & Standards (which have separate awards).*
- TC 4.03 did not have a nominee last year. Nominations are due September 1 each year, and I would like to submit our strongest candidate each year. Desirable qualities include include Seminar and Conference Paper programs, Handbook & Program subcommittee work including officer positions, and service as TC officer.

#### *Service to ASHRAE Research Award:*

- *Recognizes excellence in volunteer service in the area of Society research. Desirable qualities include authorship of RTARs and Work Statements, participation or chairing of multiple PMS and PES, and Research subcommittee work including Research Subcommittee Chair. This award is for a volunteer in support of Research, not a paid researcher and not a donor to ASHRAE Research.*
- TC 4.03 did not have a nominee last year. Nominations are due September 1 each year, and I would like to submit our strongest candidate each year.

#### *ASHRAE Fellow:*

- *Recognizes distinction in the arts relating to the sciences of heating, refrigeration, air conditioning or ventilation, or the allied arts and sciences, or in the teaching of major courses in said arts and sciences, or who by reason of invention, research, teaching, design, original work, or as an engineering executive on projects of unusual or important scope, has made substantial contribution to said arts and sciences, and has been in good standing as a full grade Member for at least ten (10) years is eligible for election to the grade of Fellow.*
- New nominations are due December 1 each year. Please help me identify suitable candidates from this TC, including yourself if you feel you are eligible.

#### *Distinguished Service Award:*

- *Recognizes members who have served ASHRAE faithfully as a member of committees or otherwise giving freely of his/her time and talent on behalf of the Society. Lifetime cumulative points-based system with a minimum of 15 points required (with at least 3 points in 3 different categories).*
- On behalf of TC 4.03, I formally nominated **Michael Blanford** for this honor last year, and that nomination is working its way through the system. The Board of Directors reviews it this meeting, and assuming it is approved, the award is presented at the Plenary of the 2018 Annual Conference in Houston.
- The points tally sheet is available on the ASHRAE website or directly from me.
- **New nominations are due May 1 each year.** Self-nominations are permitted. Please help me identify additional suitable candidates from this TC, including yourself if you feel you are eligible and have not yet received this award. There is no quantity limit for nominees nor honorees.



***Exceptional Service Award:***

- *Recognizes members who have served the Society faithfully and with exemplary effort, far in excess of that required for the Distinguished Service Award. Lifetime cumulative points-based system with a minimum of 45 points required (with at least 7 points in 3 different categories).*
- The points tally sheet is available on the ASHRAE website or directly from me.
- **New nominations are due May 1 each year.** Self-nominations are permitted. Please help me identify additional suitable candidates from this TC, including yourself if you feel you are eligible and have not yet received this award.

***Other Awards on my Radar:*** Send any suggested nominations for the following to Steve Duda.

- **ASHRAE Award for Distinguished Public Service.** *Recognizes ASHRAE members who have performed outstanding public service in their community, and in doing so, have helped to improve the public image of the engineer. This is a competitive award, with a maximum of one chosen per year. Nominations are due December 1 each year.*
- **Standards Achievement Award.** *Recognizes excellence in volunteer service for developing ASHRAE Standards and/or Guidelines. This is a competitive award, with a maximum of one chosen per year. Nominations are due December 1 each year.*
- **Andrew T. Boggs Service Award.** *Recognizes a past Exceptional Service Awardee for continued, unselfish, dedicated and distinguished service to the Society. This is a competitive award, with a maximum of one chosen per year. To be eligible, one must already have won the Exceptional Service Award. **New nominations are due May 1 each year.***
- **Leslie & Bill Holladay Distinguished Fellow Award.** *Recognizes a Fellow of the Society who continues preeminence in engineering or research. This is a competitive award, with a maximum of one chosen per year. To be eligible, one must already be a Fellow of the Society. **New nominations are due May 1 each year.***
- **F. Paul Anderson Award.** *Honors a member for notable achievement, outstanding work or service in any field of the Society. This is ASHRAE's highest honor. Congratulations to **Steve Taylor!** He receives his award at the Saturday Plenary of this Conference. An excerpt from the citation reads that Steve exceptional support to ASHRAE by bringing a dozen or so members of his small engineering firm to every Winter & Annual Conference; 18 years on SSPC 90.1, Chaired SSPC 62.1, SGPC 13, and GPC 16 for a total of 40+ man-years on a Standard; a prolific author with 30+ Journal articles; 30+ seminar and symposium presentations; and original work in temperature controls sequences and chiller plant optimization.*

Respectfully submitted by:

Stephen W. Duda  
TC 4.03 Honors & Awards Chair  
January 15, 2018