



Shaping Tomorrow's  
Built Environment Today

1791 Tullie Circle NE ▪ Atlanta, Georgia 30329-2305 ▪ Tel 404-636-8400 ▪ Fax 404-321-5478 ▪ <http://www.ashrae.org>

## **MINUTES**

### **ASHRAE Technical Committee 4.3: Ventilation Requirements & Infiltration**

2020 Winter Meeting

Monday February 3, 2020, 4:15 pm-6:30 pm

Hilton Orlando, L, Pocket Lake

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#### **1. INTRODUCTION**

##### 1.1. Call To Order

##### 1.2. Committee and Meeting Information

###### **Scope of TC 4.3**

*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.*

###### **ASHRAE Code of Ethics**

*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>.)”*

###### **Subcommittee and Research Meetings**

Research: During Main Meeting

Program: During Main Meeting

Handbook: During Main Meeting

RP-1819: Tuesday Feb 4, Hilton Orlando, Turkey Lake

RP-1823: Monday Feb 3, Hilton Orlando, Pocket Lake

###### **Website**

TC4.3 Homepage: <https://tc0403.ashraetcs.org/>

TC4.3 Basecamp: <https://3.basecamp.com/3106353/projects/10524322>

##### 1.3. Introductions



**1791 Tullie Circle, N.E./Atlanta, GA 30329  
404-636-8400**

**TC/TG/MTG/TRG MINUTES COVER SHEET**

**(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)**

TC/TG/MTG/TRG No. TC 4.03 DATE February 3, 2020

TC/TG/MTG/TRG TITLE Ventilation Requirements & Infiltration

DATE OF MEETING February 3, 2020 LOCATION Hilton Orlando, L, Pocket Lake

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Martin Stangl	2018			David Claridge (Research Liaison)
Nathan Ho	2018			Stephen Duda (Honors)
John Carter	2019			James Bennett (S.04 Head)
Jordan Clark	2019			
Steven Emmerich	2019			
Steve Taylor	2019			
Brian Rock	2018			

**DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:**

TAC Section Head: Jamie Bennett	SHx@shrae.net Where x is the section number
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	See ASHRAE email alias list for needed addresses.
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

Note: These draft minutes have not been approved and not the official, approved record until approved by the TC.



#### 1.4. Attendance + Quorum

<b>Voting Members</b>					
	<b>Name</b>	<b>Position</b>	<b>Company</b>	<b>Roll Off (June 30)</b>	<b>Present?</b>
1	Martin Stangl	Chair	RWDI	2020	X
2	Nathan Ho	Vice-chair	P2S Engineering	2020	X
3	John Carter	Secretary	CPP	2023	X
4	Jordan Clark	Research	Ohio State University	2021	X
5	Steven Emmerich	Standards	NIST	2023	X
6	Steve Taylor	Member	Taylor Engineering	2021	X
7	Brian Rock	Handbook	University of Kansas	2022	X
<b>Non-Voting Officers</b>					
	Josephine Lau	Program	University of Nebraska	-	
	Steve Duda	Honors	Ross & Baruzzini, Inc.	-	X

**Note:** Quorum > 1/2 all VM, excluding NQM; super majority  $\geq 2/3$  VM present; simple majority > 1/2 VM present

#### 1.5. Approve Agenda (Emmerich/Rock: 6-0-0 CNV)

#### 1.6. Approve Minutes of Past Meeting (Kansas City 2019) (Taylor/Rock: 5-0-1 CNV)

#### 1.7. Section Head Report (Jamie Bennet)

##### 1.7.1. Reorganization of all functional groups, focus on TCs right now

1.7.1.1. Evaluating performance (quorum, holding meetings, regular function of TC)

1.7.1.2. Should review Title/Purpose/Scope at least once a year.

1.7.1.3. Try to integrate with other TCs if it makes sense

1.7.1.4. Record some activity each meeting

1.7.1.5. 10 Voting members or less being targeted to justify meeting space

1.7.1.6. Small subcommittees possibly to get moved into general meeting space

#### 1.8. Liaison Reports



- 1.8.1. Conferences and Expositions Committee (CEC) - TBD No Report
- 1.8.2. Handbook Committee - Guy Frankenfield
  - 1.8.2.1. Chapter 16 is due to be submitted by April 5<sup>th</sup> (revised/reviewed/voted)
  - 1.8.2.2. Chapter 24 is due July 21<sup>st</sup> (revised/reviewed/voted)
- 1.8.3. Professional Development Committee (PDC) – Donald Brandt No Report
- 1.8.4. Technical Activities Committee (TAC) - Dennis Wessel No Report
- 1.8.5. Special Publications - Francis Mills No Report
- 1.8.6. Environmental Health Committee - Josephine Lau Not Present, Report Attached.
- 1.8.7. Research (RAC) – David Claridge
  - 1.8.7.1. Nothing earth shattering coming down
  - 1.8.7.2. RAC welcomes someone from the committee to present to them RTARs and WS, need to schedule in advance
  - 1.8.7.3. WS1878 was approved with comments in Kansas City, needs to be returned
- 1.8.8. Standards – Steve Emmerich
  - 1.8.8.1. See Standards below

## 2. SUBCOMMITTEE REPORTS

### 2.1. Research (Jordan Clarke)

- 1.2.6. Active Research Project Status
  - 1.2.6.1. RP-1819: CO<sub>2</sub> Demand Controlled Ventilation in Multiple Zone VAV Systems with Multiple Recirculation Paths
    - TC4.3 PMS is Steve Taylor, Josephine Lau
      - PMS meets tomorrow for almost certainly final time
      - Draft final report has been submitted (really good) expect only minor comments
      - Anticipate letter ballot before next meeting
  - 1.2.6.2. RP-1823: Improved Exhaust-to-Intake Dilution (Concentration) Calculations
    - TC 4.3 PMS is Steve Taylor, Iain Walker, Brian Rock
    - PMS meets after main committee
    - Expected to be last meeting
- 1.1.1. Work Statements (WS)
  - 1.1.1.1. WS-1835: Characterization of Induced Flow Fans



- TC9.10 (Brad Cochran)
  - Has been approved and expected to go out to bid next year

1.1.2. Research Topic Acceptance Request (RTAR)

1.1.2.1. RTAR-1878: Outdoor particulate matter penetration and indoor PM removal rates in naturally ventilated commercial buildings

- TC4.3 (Jordan Clarke)
  - WS In progress, should have something to look at before next meeting

1.1.3. Multidisciplinary Task Group (MTG)

- Idea of MTC around VOC's and VOC Mixtures and What Constitutes Air Quality (Ed Light) **NO Report, DELETE from NEXT AGENDA**

1.1.4. On Hold or Inactive

- Is CO2 a Pollutant or and Indicator? (Steve Taylor) Other work has been done, **DROP FROM OUR LIST.**

1.1.5. New Ideas

Name	Champions	Status/Actions
Infiltration vs. Pressurization impact with ERVs	Josephine Lau	No action
Electric Vehicle effects on Garage Exhaust Requirements	Steve Taylor	No action
Understanding formaldehyde generation rates	Nathan Ho/Lisa Ng	Iain Walker, some recent studies have been published or are almost published so probably not needed by this committee.
Comparison Between Wind Tunnel and CFD for Different Applications		MOVE TO PROGRAM
Interaction of Air Tightening and Gas Appliance Venting	Craig Wray IAIN WALKER	CRAIG HAS NO TIME HOPEFULLY SOMEONE CAN PICK IT UP
Performance of Electronic Air Cleaners and Interaction with Ventilation	4.3 Suggested as Co-Sponsor	FROM OLD LIST NO CURRENT ADVOCATE



Interaction of Radiant Floor with Underfloor Ventilation	4.3 Suggested as Co-Sponsor	FROM OLD LIST NO CURRENT ADVOCATE
Transfer Air, etc. in multi-family Buildings	Iain Walker, Craig Wray	No action
Cost effectiveness of sealing between floors in multistory buildings to reduce stack effect, requirements to reduce multi-family internal partition leakage	Marianne Touchie, Gren Yuill, from University of Toronto	subject of current study, can be removed
Co-Sponsor Ceiling Fans RTAR initiated by TC4.10, 2.1?, maybe 5.10. Program item by TC4.10	Shichao Liu	THIS IS PROGRAM TOPIC FOR TC 4.10
RTAR from 62.2 went through TC2.3 Ask 62.2 to bring it to TC4.3 for co-sponsorship	Walker	
UNSOLICITED RESEACH PROPOSAL about testing a “representative” sample of buildings for leakage		Waiting or RAC to assign URP.
TC2.6 Sound & Vibration as proxy for air leakage	Marianne Touchie,	RTAR?
Enhance the current Stack Height Reduction Factor Methodology for Plume Dispersion Calculations for stacks from screen height to 2.5 x screen height	Carter/Parker	
Evaluate effect of screenwalls or other large roof objects on previously evaluated plume rise enhancement of stack ganging	Carter/Parker	

#### 1.1.1. Deadlines

- March 1 (for spring RAC meeting)
- May 15 (for June meeting)
- August 15 (for fall RAC meeting)
- December 15 (for January meeting)

#### 1.1.2. Special Topics

- 1.1.2.1. Presentation by Marianne Touchie – Update on project at the University of Toronto on ‘Characterizing Interzonal Air Leakage in Multi-Family Buildings’

## 2.2. Program (Josephine Lau)

- 2.2.1. Evaluation of Kansas City Program (Annual Meeting 2019)
- 2.2.2. Orlando Program (Winter Meeting 2020)



2.2.3. Austin, TX Program (Annual Meeting 2020)

2.2.4. Future Program/New Ideas

City	Title	Type	Chair/Speakers
Chicago	Where has my air been?	Seminar	John C, Martin/Parker/?
Chicago?	62.2 update	Seminar	Iain Walker
??	Assessment of VOC mixtures	Workshop	Ed Light (with MTG)
??	Computational modeling of airflow around buildings	Seminar	John Carter, Ted Stathopoulos, Brad Cochran/Philipps
	Burning Questions around Wildfires and ventilation/IAQ	Forum	Isaac Simpson
Austin	Sensors for control of ventilation and air cleaning	Seminar	Jordan Clark
Austin	Multifamily Myths	Seminar	Touchie/Wray/Philips/Dols
Chicago	Smart Residential Ventilation	Seminar	Emmerich/Walker

2.2.5. Deadlines

2.2.5.1. *For 2020 Annual meeting in Austin*

- *Monday, February 10, 2020 Program (Seminar, Forum, Workshop, Debate and Panel) and Extended Abstract Paper Due*
- *Monday, March 2, 2020 Extended Abstracts Accept/Reject Notifications*
- *Monday, March 16, 2020 Debate, Panel, Seminar, Forum, Workshop Accept/Reject Notifications*
- *Monday, June 1, 2020 Presentation submissions due*

2.2.5.2. *For 2121 Winter meeting in Chicago*

- *Wednesday, March 18, 2020: Conference Paper Abstracts, Technical Papers and Paper Session Requests Due*
- *Monday, June 15, 2020: Website Opens for Seminar, Workshop, Forum, Debate, and Panel Proposals*
- *Monday, October 5, 2020: Seminar, Workshop, Forum, Debate, and Panel Accept/Reject Notifications*



### 2.3. Handbook (Brian Rock)

#### 2.3.1. Chapter Status

Volume	Chapter	Lead	Status
2021 Fundamentals	Chapter 16 Ventilation and Infiltration	Jordan Clark	
2021 Fundamentals	Chapter 24 Airflow Around Buildings	Ted Stathopoulos	
2019 Applications	Chapter 45 Building Air Intake and Exhaust Design	Jason Urso	

#### 2.1.1. Revisor Information

Access files, for revision, via <https://authoring.ashrae.org/> (Internet Explorer use req'd)

**Chapter reviews:** If you have colleagues who are practicing in or otherwise interested in any of our topics, please ask them to review our as-published chapters. They can submit their reviews via [http://xp20.ashrae.org/secure/handbook/chapter\\_review/](http://xp20.ashrae.org/secure/handbook/chapter_review/)

The website for our revisers is <https://www.ashrae.org/technical-resources/ashrae-handbook/ashrae-handbook-central>

#### 2.1.2. Deadlines

- *The deadline for submitting your chapter revisions for first review are; April 05<sup>th</sup> for Chapter 16, Ventilation, and July 21<sup>st</sup> for Chapter 24, Airflow Around Buildings*

### 2.4. Standards (Steven Emmerich)

#### 2.4.1. TC 4.3 Cognizant

##### 2.4.1.1. 62.1 Ventilation for Acceptable Indoor Air Quality (Nathan Ho)

- 2.4.1.1.1. Published new version in 2019
- 2.4.1.1.2. ASHRAE Journal articles forthcoming about the changes
- 2.4.1.1.3. Guideline 42P Enhanced .....
- 2.4.1.1.4. Changed name to “Ventilation for ~~Acceptable~~ Indoor Air Quality“



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2.4.1.1.5. Discussion about acceptable leaking with respect to ERV

2.4.1.1.6. Most recent public review missed scrutiny about new dew point control

2.4.1.2. 62.2 Ventilation for Acceptable IAQ in Low-Rise Residential Buildings (Iain Walker)

2.4.1.2.1. Ongoing issues with Addendum A (restrict use of vented combustion)

2.4.1.2.2. 2019 version is out

2.4.1.2.3. Working on sections specific to multi-family buildings

2.4.1.2.4. Possibility to include garage ventilation requirements in single family home with attached garage if has building ventilation components

2.4.1.2.5.

2.4.2. Other Standards of Interest TC 4.3

2.4.2.1. 90.1 (Steve Emmerich)

2.4.2.2. 170-2013: TC 9.6: Ventilation of Healthcare Facilities (Rick Hermans)

## **2.5. Honors (Steve Duda)**

2.5.1. No current nominees, described some of the awards where application is due in May (Distinguished, Exceptional, Boggs, distinguished Fellow)

## **2.6. WebMaster (Martin Stangl)**

## **2.7. Membership (Martin Stangl)**

- Subcommittee Chair Needed
- Want to have more manufacturer representation on the committee

## **3. New Business**

3.1. MTG.OBD (Occupant Behaviours) (Mini Malhotra)

3.2. Coordination with TC 4.10 regarding modeling airflow around building. Discussed what is the appropriate level of guidance for ASHRAE to be providing. No conclusion but discussion should continue.

3.3. Future Meetings



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- June 27-July 1, 2020 – Austin, TX
- January 23 – 27, 2021 – Chicago, IL
- June 26-30, 2021 – Phoenix, AZ
- January 29 – February 2, 2022 – Las Vegas, NV
- June 25-29, 2022 – Toronto, ON

#### **4. ADJOURN**

Time: 18:38 EST

# Appendix A: Attendance Form

VENTILATION REQUIREMENTS & INFILTRATION-T-TAC-TC04.03

As of Any Date

Chair  
8084972 037 Voting

Term in Position: 07/01/2018 to 06/30/2020  
Term on Committee: 07/29/2014 to 06/30/2020

**Mr Martin Stangl**

RWDI  
600 Southgate DR  
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Research Subcommittee Chair  
8347433 073 Voting

Term in Position: 07/01/2019 to 06/30/2021  
Term on Committee: 06/25/2016 to 06/30/2021

**Dr Jordan D. Clark**

The Ohio State University  
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2036 Neil Ave  
Columbus, OH 43210-1226  
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Vice Chair  
8121818 105 Voting

Term in Position: 07/01/2018 to 06/30/2020  
Term on Committee: 07/01/2016 to 06/30/2020

**Mr Nathan L Ho** YEA

P2S Engineering  
5000 E Spring St Ste 8  
Long Beach, CA 90815-5218  
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Standards Subcommittee Chair  
5057464 025 Voting

Term in Position: 07/01/2019 to 06/30/2023  
Term on Committee: 07/01/2001 to 06/30/2023

**Mr Steven J Emmerich**

NIST  
100 Bureau Dr # Ms8633  
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Email: sjemmerich@comcast.net

Secretary  
5185848 073 Non-voting

Term in Position: 07/01/2019 to  
Term on Committee: 07/01/2000 to 06/30/2023

**Mr John J Carter**

CPP  
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Webmaster  
8084972 037 Non-voting

Term in Position: 07/01/2019 to  
Term on Committee: 07/29/2014 to 06/30/2020

**Mr Martin Stangl**

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Program Subcommittee Chair  
8071140 075 Non-voting

Term in Position: 07/01/2019 to  
Term on Committee: 02/02/2010 to 06/30/2018

**Dr Josephine Lau, PhD**

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Member  
5185848 073 Voting

Term in Position: 07/01/2019 to 06/30/2023  
Term on Committee: 07/01/2000 to 06/30/2023

**Mr John J Carter**

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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

As of Any Date

Member  
2026715                      053                      Voting

Term in Position:    07/01/2018 to 06/30/2022  
Term on Committee: 07/01/1993 to 06/30/2022

**Mr Brian A Rock, FASHRAE, PE** 

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Provisional Corresponding Member  
5184888                      067                      Non-voting

Term in Position:    01/29/2019 to 01/29/2021  
Term on Committee: 01/29/2019 to 01/29/2021

**Miss Jeanine T Bounds**

PO Box 850271  
Richardson, TX 75085-0271

Phone: (214)517-9276    Fax:  
Email: jtbounds@hotmail.com

Member  
733117                      082                      Voting

Term in Position:    07/01/2019 to 06/30/2021  
Term on Committee: 07/01/2001 to 06/30/2021

**Mr Steven T Taylor, PE** 

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Provisional Corresponding Member  
8371004                      032                      Non-voting

Term in Position:    03/06/2019 to 03/06/2021  
Term on Committee: 03/06/2019 to 03/06/2021

**Mr Christopher Michael Carson**

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Provisional Corresponding Member  
8280483                      109                      Non-voting

Term in Position:    05/14/2018 to 05/14/2020  
Term on Committee: 05/14/2018 to 05/14/2020

**Mr Akshay Bhargava**    YEA

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Term in Position:    08/06/2019 to 08/06/2021  
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**Mr Michael Craig** 

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8304112                      163                      Non-voting

Term in Position:    05/02/2018 to 05/02/2020  
Term on Committee: 05/02/2018 to 05/02/2020

**Mr NIKHILESH SINGH**    YEA  
**BIST**

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8333687                      163                      Non-voting

Term in Position:    04/22/2018 to 04/22/2020  
Term on Committee: 04/22/2018 to 04/22/2020

**Mr Kautuk Dikshit**    YEA

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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Provisional Corresponding Member  
 2043373                      103                      Non-voting  
 Term in Position:      05/09/2019 to 05/09/2021  
 Term on Committee:    05/09/2019 to 05/09/2021  
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 Welch Morris + Associates  
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 Term on Committee:    05/23/2018 to 05/23/2020  
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 8352759                      016                      Non-voting  
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 Term on Committee:    03/20/2018 to 03/20/2020  
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 Term on Committee:    10/17/2018 to 10/17/2020  
**Mr Matt D Mason PE**                      YEA  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Provisional Corresponding Member  
5224176 057 Non-voting  
Term in Position: 08/15/2018 to 08/15/2020  
Term on Committee: 08/15/2018 to 08/15/2020

**Dr Zheng O'Neill**

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Provisional Corresponding Member  
8356821 073 Non-voting  
Term in Position: 01/13/2019 to 01/13/2021  
Term on Committee: 01/13/2019 to 01/13/2021

**Dr Ryan Parker** YEA

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Provisional Corresponding Member  
8278396 066 Non-voting  
Term in Position: 01/03/2019 to 01/03/2021  
Term on Committee: 01/03/2019 to 01/03/2021

**Mr Fernando Perez**

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Provisional Corresponding Member  
8282888 163 Non-voting  
Term in Position: 03/16/2018 to 03/16/2020  
Term on Committee: 03/16/2018 to 03/16/2020

**Mr Sahil Priyadarshi** YEA

GreenTree Global  
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Provisional Corresponding Member  
8357685 081 Non-voting  
Term in Position: 12/21/2018 to 12/21/2020  
Term on Committee: 12/21/2018 to 12/21/2020

**Mr Christopher Paul Ruch**

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Provisional Corresponding Member  
8134247 Non-voting  
Term in Position: 01/09/2019 to 01/09/2021  
Term on Committee: 01/09/2019 to 01/09/2021

**Mr David Schaeffer**

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Provisional Corresponding Member  
8355055 082 Non-voting  
Term in Position: 11/16/2018 to 11/16/2020  
Term on Committee: 11/16/2018 to 11/16/2020

**Mr Isaac Simpson**

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Provisional Corresponding Member  
8347552 022 Non-voting  
Term in Position: 01/14/2019 to 01/14/2021  
Term on Committee: 01/14/2019 to 01/14/2021

**Dr Gourish Sirdeshpande**

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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

As of Any Date

Provisional Corresponding Member  
 8242323 506 Non-voting  
 Term in Position: 01/18/2020 to 01/18/2022  
 Term on Committee: 01/18/2020 to 01/18/2022  
**Mr zay zay**  
 Yadanar Street  
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 AA. Medical  
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Provisional Corresponding Member  
 8226304 105 Non-voting  
 Term in Position: 06/18/2019 to 06/18/2021  
 Term on Committee: 06/18/2019 to 06/18/2021  
**Mr Trevor Brink Zeller YEA**  
 5000 E Spring St 8th FL  
 5000 E Spring St 8th FL  
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 P2S Engineering  
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Corresponding Member  
 8312844 082 Non-voting  
 Term in Position: 07/07/2018 to  
 Term on Committee: to  
**Ms Elizabeth Christine Balke YEA**  
 Taylor Engineering  
 1080 Marina Vlg Pkwy Ste 501  
 Alameda, CA 94501-1142  
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Corresponding Member  
 7982656 Non-voting  
 Term in Position: 07/01/2002 to  
 Term on Committee: to  
**Mr Dennis C Barley**  
 NREL  
 15013 Denver West Pkwy  
 Lakewood, CO 80401-3111  
 Phone: Fax:  
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Corresponding Member  
 5138006 025 Non-voting  
 Term in Position: 07/01/2015 to  
 Term on Committee: 07/01/2010 to 06/30/2015  
**Mr Michael D Blanford**  
 U.S Dept. Of Housing & Urban Development  
 Office Policy Development & Research  
 451 7th St SW Rm 8134  
 Washington, DC 20410-0001  
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Corresponding Member  
 74721 020 Non-voting  
 Term in Position: 07/01/2006 to  
 Term on Committee: 07/01/2004 to 06/30/2006  
**Mr Alexander Boome, IV, P.Eng, PE**  
 1625 Hornby ST Apt 702  
 Vancouver, BC V6Z 2M2 CANADA  
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Corresponding Member  
 8138982 999 Non-voting  
 Term in Position: 07/01/2016 to  
 Term on Committee: 02/12/2015 to 06/30/2016  
**Lance R Brown YEA**  
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Corresponding Member  
 5116450 064 Non-voting  
 Term in Position: 07/01/2005 to  
 Term on Committee: to  
**Ms Heather L Camden**  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

As of Any Date

Corresponding Member  
113108 104 Non-voting  
Term in Position: 07/01/2006 to  
Term on Committee: 07/01/1996 to 06/30/2006  
**Mr Bernardo Cardenal,**  
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Boca Raton, FL 33498-6704  
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Corresponding Member  
5013789 999 Non-voting  
Term in Position: 07/01/1997 to  
Term on Committee: to  
**Dr Qingyan (Yan) Chen**  
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Corresponding Member  
5182029 073 Non-voting  
Term in Position: 07/01/2016 to  
Term on Committee: 06/29/2015 to 06/30/2016  
**Mr Brad C Cochran**  
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Corresponding Member  
5018335 113 Non-voting  
Term in Position: 07/01/2004 to  
Term on Committee: to  
**Mr Leonard A Damiano**  
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Smithville, MO 64089-9258  
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Corresponding Member  
8225389 032 Non-voting  
Term in Position: 07/01/2017 to  
Term on Committee: 07/26/2016 to 06/30/2017  
**Dr Danko Davidovic**  
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Corresponding Member  
5203312 004 Non-voting  
Term in Position: 07/01/2007 to  
Term on Committee: to  
**Mr Darryl W DeAngelis**  
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Longmeadow, MA 01106-1503  
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Corresponding Member  
8103496 022 Non-voting  
Term in Position: 04/23/2017 to  
Term on Committee: 04/23/2015 to 04/22/2017  
**Dr Jason W DeGraw**  
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Corresponding Member  
5150823 021 Non-voting  
Term in Position: 07/01/2006 to  
Term on Committee: to  
**Dr Gregory Dobbs, PhD,**  
**LEED AP BEMP HPDP**  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Corresponding Member  
5200188 026 Non-voting  
Term in Position: 07/01/2012 to  
Term on Committee: 07/01/2007 to 06/30/2012  
**Mr William S Dols**  
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Corresponding Member  
2043198 Non-voting  
Term in Position: 07/01/2003 to  
Term on Committee: 07/01/1986 to 06/30/2003  
**Dr Helmut E Feustel**  
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Corresponding Member  
5070363 054 Non-voting  
Term in Position: 07/01/2017 to  
Term on Committee: 07/01/2007 to 06/30/2017  
**Mr Stephen W Duda, PE**  
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Corresponding Member  
5171927 026 Non-voting  
Term in Position: 07/01/2010 to  
Term on Committee: 07/01/2006 to 06/30/2010  
**Mr Todd D Friedman**  
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8309320 016 Non-voting  
Term in Position: 07/01/2019 to  
Term on Committee: 02/21/2017 to 02/21/2019  
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Corresponding Member  
2025694 146 Non-voting  
Term in Position: 07/01/2016 to  
Term on Committee: 07/01/2001 to 06/30/2016  
**Ms Dianne M Griffiths, PE**  
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Corresponding Member  
5219535 073 Non-voting  
Term in Position: 07/01/2019 to  
Term on Committee: 04/01/2014 to 06/30/2019  
**Ms Xia Fang**  
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Corresponding Member  
2006379 030 Non-voting  
Term in Position: 07/01/1997 to  
Term on Committee: to  
**Mr Richard A Grot**  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Corresponding Member  
 2049280 014 Non-voting  
 Term in Position: 07/01/1988 to  
 Term on Committee: 07/01/1996 to 06/30/2000  
**Dr Fariborz Haghghat**  
 17455 Marcel-Libersan  
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 Concordia Univ  
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Corresponding Member  
 5012232 999 Non-voting  
 Term in Position: 07/01/1993 to  
 Term on Committee: to  
**Prof Shinsuke Kato, PhD**  
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 Tokyo, 101-0032 JAPAN  
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Corresponding Member  
 8071140 075 Non-voting  
 Term in Position: 07/01/2018 to  
 Term on Committee: 02/02/2010 to 06/30/2018  
**Dr Josephine Lau, PhD**  
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 1110 South 67th Street  
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Corresponding Member  
 3034586 206 Non-voting  
 Term in Position: 07/01/2011 to  
 Term on Committee: 07/01/1989 to 06/30/2011  
**Dr Martin W Liddament**  
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 Caversham Heights Berkshire  
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 8223536 026 Non-voting  
 Term in Position: 07/01/2019 to  
 Term on Committee: 04/01/2014 to 06/30/2019  
**Mr Ed Light**  
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 8312229 109 Non-voting  
 Term in Position: 07/12/2017 to  
 Term on Committee: to  
**Mr Bruce B Lindsay**  
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Corresponding Member  
 8185085 001 Non-voting  
 Term in Position: 09/11/2017 to  
 Term on Committee: to  
**Dr Shichao Liu** YEA  
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 Worcester Polytechnic Institute  
 Worcester, MA 01609  
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 5074059 001 Non-voting  
 Term in Position: 07/01/2004 to  
 Term on Committee: 07/01/2000 to 06/30/2004  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Corresponding Member  
8091166 015 Non-voting  
Term in Position: 07/01/2013 to  
Term on Committee: 07/01/2008 to 06/30/2013  
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Corresponding Member  
8029136 099 Non-voting  
Term in Position: 07/01/2019 to  
Term on Committee: 03/01/2012 to 06/30/2019  
**Dr Mini Malhotra**  
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Corresponding Member  
8217852 062 Non-voting  
Term in Position: 09/13/2017 to  
Term on Committee: to  
**Mr Dennis W Mathes**  
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Corresponding Member  
8095236 106 Non-voting  
Term in Position: 07/01/2014 to  
Term on Committee: 07/06/2012 to 06/30/2014  
**Miss Christine C Maurer**  
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Corresponding Member *present*  
508538 082 Non-voting  
Term in Position: 07/01/2008 to  
Term on Committee: 07/01/2003 to 06/30/2008  
**Prof Mark P Modera, PhD,  
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Corresponding Member  
8147850 999 Non-voting  
Term in Position: 07/01/2016 to  
Term on Committee: 04/01/2014 to 03/31/2016  
**Mr Bryan Morris**  
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Corresponding Member  
5012230 506 Non-voting  
Term in Position: 07/01/1997 to  
Term on Committee: to  
**Mr Shuzo Murakami**  
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Corresponding Member  
5131200 097 Non-voting  
Term in Position: 07/01/2003 to  
Term on Committee: to  
**Dr Amy B Musser**  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Corresponding Member  
 2001094                    049                    Non-voting  
 Term in Position:    07/01/1999 to  
 Term on Committee:                    to  
**Mr Victor A Neuman, PE**

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Corresponding Member  
 5185948                    066                    Non-voting  
 Term in Position:    07/01/2006 to  
 Term on Committee:                    to  
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Corresponding Member  
 549544                    503                    Non-voting  
 Term in Position:    07/01/2006 to  
 Term on Committee:    07/01/2002 to 06/30/2006

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Corresponding Member  
 2040270                    015                    Non-voting  
 Term in Position:    07/01/2017 to  
 Term on Committee:    07/01/2004 to 06/30/2017

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Corresponding Member  
 3001625                    073                    Non-voting  
 Term in Position:    07/01/2003 to  
 Term on Committee:    07/01/1997 to 06/30/2003

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Corresponding Member  
 3026639                    106                    Non-voting  
 Term in Position:    07/01/2002 to  
 Term on Committee:                    to  
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Corresponding Member  
 8099022                    026                    Non-voting  
 Term in Position:    07/01/2009 to  
 Term on Committee:                    to

**Mr Donald Prather**  
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Corresponding Member  
 5045867                    155                    Non-voting  
 Term in Position:    07/01/2015 to  
 Term on Committee:    07/01/2004 to 06/30/2015

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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

## As of Any Date

Corresponding Member  
 5122944 094 Non-voting  
 Term in Position: 07/01/2010 to  
 Term on Committee: to  
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Corresponding Member  
 8075107 026 Non-voting  
 Term in Position: 08/11/2017 to  
 Term on Committee: to  
**Mrs Rae A.R. Thrift**  
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Corresponding Member  
 5140055 Non-voting  
 Term in Position: 07/01/2008 to  
 Term on Committee: 07/01/2001 to 06/30/2008  
**Mr Theodore Stathopoulos**  
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Corresponding Member  
 8258937 016 Non-voting  
 Term in Position: 07/01/2017 to  
 Term on Committee: 11/03/2016 to 06/30/2017  
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 8111547 049 Non-voting  
 Term in Position: 07/01/2013 to  
 Term on Committee: to  
**Dr Brent Stephens YEA**  
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Corresponding Member  
 5056023 162 Non-voting  
 Term in Position: 02/01/2011 to  
 Term on Committee: to  
**Dr Samir R Traboulsi**  
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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

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## VENTILATION REQUIREMENTS &amp; INFILTRATION-T-TAC-TC04.03

As of Any Date

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VENTILATION REQUIREMENTS & INFILTRATION-T-TAC-TC04.03

As of Any Date

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# Appendix B: CEC Update

## Conferences and Expositions Committee Information Items for Technical Committees

2020 Winter Conference, Orlando, Florida  
February 1-5, 2020

2020 Winter Conference, Orlando, Florida

Thank you to all the TCs who helped with the review of the technical, conference and extended abstract papers, submitted program proposals and otherwise participated in the development of the conference!

Technical Program Statistics for Orlando:

### Paper Sessions

*(Conference/Technical Papers combined)*

- 25 Paper Sessions

### Conference Papers

- 165 conference paper abstracts submitted, 137 approved
- 73 conference papers presented

### Technical Papers

- 27 Technical papers received
- 25 Technical papers presented

### Seminars

- 123 submitted
- 75 presented

### Panels

- 2 submitted
- 2 scheduled

### Workshops

- 6 submitted
- 2 scheduled (*1 presented in TC Mtg.*)

### Forums

- 5 submitted
- 1 scheduled

### Debates

- 2 submitted
- 2 scheduled

Conferences and Upcoming Deadlines

A full list of ASHRAE conferences and program details is available at <https://www.ashrae.org/conferences>.

Conference	Upcoming Deadline	Conference Site
<b>2020 ASHRAE Annual Conference</b> Austin, TX June 27 – July 1, 2020	Extended Paper abstracts and program proposals due February 10	<a href="https://www.ashrae.org/Austin">ashrae.org/Austin</a>
<b>IAQ 2020: Indoor Environmental Quality Performance Approaches</b> , Athens, Greece September 14-16, 2020	Notifications on abstract submissions, February 12	<a href="https://www.ashrae.org/iaq2020">ashrae.org/iaq2020</a>
<b>The Fourth International Conference on Efficient Building Design</b> Beirut, Lebanon October 1-2, 2020	Conference papers due February 15	<a href="https://www.ashrae.org/beirut">ashrae.org/beirut</a>
<b>2021 ASHRAE Winter Conference</b> Chicago, Illinois January 23–27, 2021	Conference paper abstracts and technical papers due March 18	<a href="https://www.ashrae.org/chicago">ashrae.org/chicago</a>
<b>Ventilation 2021</b> Toronto, ON Canada August 15-18, 2021	Call for papers to be announced shortly	<a href="https://www.ashrae.org/ventilation2021">ashrae.org/ventilation2021</a>

## **2020 Annual Conference, Austin, Texas**

The 2020 ASHRAE Annual Conference technical program is comprised of eight tracks as well as a mini-track, selected to represent areas of focus common among ASHRAE membership. The track focus areas include fundamentals and applications, HVAC&R systems and equipment, research summit, professional development and other specific topics including grid-interactive efficient built environment, multifamily and residential buildings, resilient buildings and communities, zero energy buildings, communities: opportunities and challenges and a building myths mini-track.

“We are living in a constant changing world. ASHRAE members are facing a major evolutionary change in how buildings and energy systems interact,” said Bing Liu, chair of the 2020 Annual Conference. “Instead of individual equipment and system, buildings are becoming integrated, flexible and resilient systems to respond to the climate change challenges. The 2020 ASHRAE Annual Conference aims to address these challenges and feature a strong technical program with a wide range of topics applicable to engineers, architects, designers and professionals.”

**Extended abstracts and program proposals are due February 10.**

## **2021 Winter Conference, Chicago, Illinois**

The deadline for submitting a conference paper abstract and or technical paper is March 18, 2020. Decisions on conference paper abstracts will be sent by April 22. Conference Papers for accepted abstracts will be due July 8, 2020.

### Tracks

**Track 1: Fundamentals and Applications**

**Track 2: HVAC&R Systems and Equipment**

**Track 3: Refrigeration and Refrigerants**

**Track 4: Environmental Health Through IEQ**

**Track 5: Building Performance and Commissioning for Operation and Management**

**Track 6: Energy Conservation**

**Track 7: International Design**

**Track 8: Standards, Guidelines and Codes**

## Topical Conferences

### **CIBSE ASHRAE Technical Symposium 2020**

Organized by CIBSE and ASHRAE, Glasgow, Scotland, April 16-17, 2020 [www.cibse.org/symposium](http://www.cibse.org/symposium)

### **IAQ 2020: Indoor Environmental Quality Performance Approaches**

Co-organized by ASHRAE and AIVC, Athens, Greece, September 14-16, 2020 [ashrae.org/iaq2020](http://ashrae.org/iaq2020)

#### Topics

- Health and Well-being
- Performance Metrics
- Interactions between IEQ parameters
- Occupant Behavior
- Smart Sensors and Big Data
- Smart Controls
- Resilience and IEQ
- Ventilation
- Air Tightness
- Thermal Comfort
- Policy and Standards

### **The Fourth International Conference on Efficient Building Design**

Co-organized by ASHRAE, the American University of Beirut, the ASHRAE Lebanese Chapter and the Munib and Angela Masri Institute of Energy and Natural Resources, Beirut, Lebanon, October 1-2, 2020 [ashrae.org/beirut](http://ashrae.org/beirut)

#### Topics

Sustainable building designs  
Energy efficiency standards  
Building materials  
Indoor air quality systems

HVAC technologies  
Solar heating and cooling for built environment  
Low and near zero energy buildings

### **Ventilation 2021**

Organized by ASHRAE, Toronto, ON Canada, Aug. 15-18, 2021 [ashrae.org/ventilation2021](http://ashrae.org/ventilation2021)

#### Topics

- Occupational health, environmental emissions and safety considerations in industrial process ventilation system design and applications
- Innovations in ventilation systems
- Thermal hydraulic modeling, measurement and test and balancing techniques, AI applications, optimization models, data mining
- Industrial HVAC Systems: Innovation and Best Practices
- Best practices and risk evaluations and management in industrial ventilation and air conditioning systems application

## Future Annual and Winter Conferences

Annual 2021 – Phoenix, Arizona, June 26 – 30

Winter 2022 – Las Vegas, Nevada, Jan. 29 – Feb. 2

Annual 2022 – Toronto, ON Canada, June 25-29

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# Appendix C: TC/TWG Reorganization Update

## **Update on TC Reorganization for TC leadership, 12/2019**

In an effort to keep all TC leadership in the loop, TAC thought it was a good idea to give you a little history, an update, and possible future steps in the efforts of the TC Reorganization.

### **History**

The direction to look at the TC structure came from the 2014 strategic plan. Based on a survey of TC chair and vice-chairs, we found the following issues were important to our members:

- We are working in silos; too specific; need wider perspective
- We need to better manage stagnant TCs and membership
- Takes too long to change things; get discouraged
- We are not maintaining industry leadership
- We need to do a better job of sharing best practices

By taking on this reorganization, we hope to accomplish many things, including:

- Increase opportunity for collaboration for programs & research
- Increase opportunity for workshops for Handbook
- Increase meeting efficiency and increase effectiveness of members' volunteer time

We asked our SHs to discuss restructuring the TCs with TC leadership- this could include merging some TCs or creating a new TC organizational structure for example. As with major change anywhere, some TCs took this as an opportunity for real change and some dug in their heels.

### **Update**

In the past year, TAC has looked into making small changes to the processes we have in place, in an effort to seek collaboration and meeting efficiency.

**TC Breakfast:** In Kansas City, we rolled out a joint breakfast for the first time. The reasons for this were many, including a more efficient way of getting important information into everyone's hands and increasing collaboration. Overall this effort was well-received, with a couple details to work out. In Orlando we will have larger tables and a bigger room, offering less background noise and enough room for everyone to have a seat at the table. This format has been very successful for RAC, so it is not a new concept.

#### ***Large Meeting Room for small meetings:***

In Orlando, we are working with staff to offer a large meeting room (similar to Atlanta, if you remember) which will be setup with many round tables. There will also be a quiet area if members need to get work done. Smaller TCs or subcommittees (10 people or less) will be encouraged to utilize this area instead of taking up multiple meeting rooms, and/or cancelling last minute. This will most likely continue in future meetings, depending on feedback in Orlando.

**TC Mergers:** Many TCs are looking into restructuring. We encourage all TCs to voluntarily consider their scope, membership and leadership, and how they can be merged with other, similar, TCs with a vote on this action at the Orlando meeting. That being stated, TAC may need to take a more proactive approach, if there is evidence of an unwillingness on the part of Functional Groups to consider change. The first round of change needs to be wrapping up in Orlando, so staff has time to update rosters as part of the regular timeline.

For TCs looking into mergers, we would recommend that the merging TCs have a revised Title, Purpose & Scope ready for TC vote in Orlando. In addition, proposed leadership and voting roster should be completed.

**Review Reminder:** Please recall that there is an annual review requirement for each committee as detailed below. We will ask each Section Head to report the recommendations from each committee to their Section at the Annual meeting in Austin. If not already on the agenda, your committee should be prepared to start discussing this recommendation in Orlando.

From the Manual of Operating Procedures (MOP):

## 1.5. Review

### 1.5.1.

Once a year, preferably at, or prior to, each Annual meeting, the Committee Chair and Committee Membership shall evaluate their progress in accomplishing the purpose for which they were constituted and recommend one of the following actions to their Section Head:

- a) Continue as a TC, TG, MTG, or TRG
  - b) Convert from a TG to a TC
  - c) Convert from a TRG to a TG or TC
  - d) Merge with a TC/TG/TRG and submit a revised scope for the merged committee
  - e) Dissolve the TC, TG, MTG, or TRG
- i) If a TC/TG/TRG/MTG votes to disband, it must establish whether any current responsibilities should be continued and, if so, recommend existing TC/TRG/MTG(s) to assume responsibility and obtain those committee's written concurrence

## Future Steps

So, a couple things that were identified early on, are still in process:

- Review functional group definitions and scopes of work to determine if current groups are efficient and best use of volunteer time.
- Clarify procedures for combining and/or dissolving FGs.
- SHs to review Activity Forms and determine which TCs are not performing. Determine plan for TC to perform or dissolve.
- Adjusting meeting times into a block schedule. We currently have many meetings happening at non-standard times which leads to conflicts in people's schedules and is a very inefficient use of meeting space.
- Looking into moving subcommittee meetings into a time slot on the same day as the main TC meeting, and maybe immediately before the main group meeting. This way, if someone can only attend for a few days, they can attend all meetings for a functional group.

As we embark in the effort of organizational restructuring to become more efficient and effective in this new strategic plan, we think it is important to focus on what makes ASHRAE special. If someone in the HVAC industry could only afford to attend one conference a year, why would they come to ASHRAE? Are we showcasing our volunteers and their knowledge effectively? We think what makes our conference great is the ability to collaborate with professionals from all over the world. Meet real people and serve humanity by solving real problems. Together. We need to step up our game- provide more opportunities for the dispersion & discussion of technical information. This is where the FG Reorganization can make a difference.