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

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
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

<table>
<thead>
<tr>
<th>MEMBERS PRESENT</th>
<th>YEAR APPTD</th>
<th>MEMBERS ABSENT</th>
<th>YEAR APPTD</th>
<th>EX-OFFicio MEMBERS AND ADDITIONAL ATTENDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martin Stangl</td>
<td>2018</td>
<td></td>
<td></td>
<td>David Claridge (Research Liaison)</td>
</tr>
<tr>
<td>Nathan Ho</td>
<td>2018</td>
<td></td>
<td></td>
<td>Stephen Duda (Honors)</td>
</tr>
<tr>
<td>John Carter</td>
<td>2019</td>
<td></td>
<td></td>
<td>James Bennett (S.04 Head)</td>
</tr>
<tr>
<td>Jordan Clark</td>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven Emmerich</td>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steve Taylor</td>
<td>2019</td>
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<td></td>
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</tr>
<tr>
<td>Brian Rock</td>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

TAC Section Head: Jamie Bennett

SHx@ashrae.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

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Company</th>
<th>Roll Off (June 30)</th>
<th>Present?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martin Stangl</td>
<td>Chair</td>
<td>RWDI</td>
<td>2020</td>
<td>X</td>
</tr>
<tr>
<td>Nathan Ho</td>
<td>Vice-chair</td>
<td>P2S Engineering</td>
<td>2020</td>
<td>X</td>
</tr>
<tr>
<td>John Carter</td>
<td>Secretary</td>
<td>CPP</td>
<td>2023</td>
<td>X</td>
</tr>
<tr>
<td>Jordan Clark</td>
<td>Research</td>
<td>Ohio State University</td>
<td>2021</td>
<td>X</td>
</tr>
<tr>
<td>Steven Emmerich</td>
<td>Standards</td>
<td>NIST</td>
<td>2023</td>
<td>X</td>
</tr>
<tr>
<td>Steve Taylor</td>
<td>Member</td>
<td>Taylor Engineering</td>
<td>2021</td>
<td>X</td>
</tr>
<tr>
<td>Brian Rock</td>
<td>Handbook</td>
<td>University of Kansas</td>
<td>2022</td>
<td>X</td>
</tr>
</tbody>
</table>

**Non-Voting Officers**

<table>
<thead>
<tr>
<th>Name</th>
<th>Program</th>
<th>Company</th>
<th>Present?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Josephine Lau</td>
<td>Program</td>
<td>University of Nebraska</td>
<td>−</td>
</tr>
<tr>
<td>Steve Duda</td>
<td>Honors</td>
<td>Ross &amp; Baruzzini, Inc.</td>
<td>−</td>
</tr>
</tbody>
</table>

*Note: Quorum>1/2 all VM, excluding NQM; super majority >=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 5th (revised/reviewed/voted)
   1.8.2.2. Chapter 24 is due July 21st (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
1.8.7. 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: CO₂ Demand Controlled Ventilation in Multiple Zone VAV Systems with Multiple Recirculation Paths
   • TC4.3 PMS is Steve Taylor, Josephine Lau
     o PMS meets tomorrow for almost certainly final time
     o Draft final report has been submitted (really good) expect only minor comments
     o 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)
  o 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)
      o 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

<table>
<thead>
<tr>
<th>Name</th>
<th>Champions</th>
<th>Status/Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infiltration vs. Pressurization impact with ERVs</td>
<td>Josephine Lau</td>
<td>No action</td>
</tr>
<tr>
<td>Electric Vehicle effects on Garage Exhaust Requirements</td>
<td>Steve Taylor</td>
<td>No action</td>
</tr>
<tr>
<td>Understanding formaldehyde generation rates</td>
<td>Nathan Ho/Lisa Ng</td>
<td>Iain Walker, some recent studies have been published or are almost published so probably not needed by this committee.</td>
</tr>
<tr>
<td>Comparison Between Wind Tunnel and CFD for Different Applications</td>
<td></td>
<td>MOVE TO PROGRAM</td>
</tr>
<tr>
<td>Interaction of Air Tightening and Gas Appliance Venting</td>
<td>Craig Wray IAIN WALKER</td>
<td>CRAIG HAS NO TIME HOPEFULLY SOMEONE CAN PICK IT UP</td>
</tr>
<tr>
<td>Performance of Electronic Air Cleaners and Interaction with Ventilation</td>
<td>4.3 Suggested as Co-Sponsor</td>
<td>FROM OLD LIST NO CURRENT ADVOCATE</td>
</tr>
<tr>
<td>Interaction of Radiant Floor with Underfloor Ventilation</td>
<td>4.3 Suggested as Co-Sponsor</td>
<td>FROM OLD LIST NO CURRENT ADVOCATE</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
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</tr>
<tr>
<td>Transfer Air, etc. in multi-family Buildings</td>
<td>Iain Walker, Craig Wray</td>
<td>No action</td>
</tr>
<tr>
<td>Cost effectiveness of sealing between floors in multi-story buildings to reduce stack effect, requirements to reduce multi-family internal partition leakage</td>
<td>Marianne Touchie, Gren Yuill, from University of Toronto</td>
<td>subject of current study, can be removed</td>
</tr>
<tr>
<td>Co-Sponsor Ceiling Fans RTAR initiated by TC4.10, 2.1?, maybe 5.10. Program item by TC4.10</td>
<td>Shichao Liu</td>
<td>THIS IS PROGRAM TOPIC FOR TC 4.10</td>
</tr>
<tr>
<td>RTAR from 62.2 went through TC2.3 Ask 62.2 to bring it to TC4.3 for co-sponsorship</td>
<td>Walker</td>
<td></td>
</tr>
<tr>
<td>UNSOLICITED RESEARCH PROPOSAL about testing a “representative” sample of buildings for leakage</td>
<td></td>
<td>Waiting or RAC to assign URP.</td>
</tr>
<tr>
<td>TC2.6 Sound &amp; Vibration as proxy for air leakage</td>
<td>Marianne Touchie,</td>
<td>RTAR?</td>
</tr>
<tr>
<td>Enhance the current Stack Height Reduction Factor Methodology for Plume Dispersion Calculations for stacks from screen height to 2.5 x screen height</td>
<td>Carter/Parker</td>
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</tr>
<tr>
<td>Evaluate effect of screenwalls or other large roof objects on previously evaluated plume rise enhancement of stack ganging</td>
<td>Carter/Parker</td>
<td></td>
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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

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

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, 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
2.3. Handbook (Brian Rock)

2.3.1. Chapter Status

<table>
<thead>
<tr>
<th>Volume</th>
<th>Chapter</th>
<th>Lead</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>2021 Fundamentals</td>
<td>Chapter 16 Ventilation and Infiltration</td>
<td>Jordan Clark</td>
<td></td>
</tr>
<tr>
<td>2021 Fundamentals</td>
<td>Chapter 24 Airflow Around Buildings</td>
<td>Ted Stathopoulos</td>
<td></td>
</tr>
<tr>
<td>2019 Applications</td>
<td>Chapter 45 Building Air Intake and Exhaust Design</td>
<td>Jason Urso</td>
<td></td>
</tr>
</tbody>
</table>

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/

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 05th for Chapter 16, Ventilation, and July 21st 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“
2.4.1.5. Discussion about acceptable leaking with respect to ERV
2.4.1.6. 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

2.4.2. 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
4. ADJOURN

Time: 18:38 EST
Appendix A: Attendance Form
<table>
<thead>
<tr>
<th>Position</th>
<th>Chair Name</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair</td>
<td>8084972</td>
<td>037</td>
<td>Voting</td>
<td></td>
</tr>
<tr>
<td>Term in Position:</td>
<td>07/01/2018</td>
<td>06/30/2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term on Committee:</td>
<td>07/01/2018</td>
<td>06/30/2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr Martin Stangl</td>
<td>RWDI</td>
<td>600 Southgate DR</td>
<td>Guelph, ON N1G 4P6 CANADA</td>
<td></td>
</tr>
<tr>
<td>Phone: 5198231311</td>
<td>Fax: 5198231316</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email: <a href="mailto:Martin.Stangl@rwdi.com">Martin.Stangl@rwdi.com</a></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Vice Chair</td>
<td>8121618</td>
<td>105</td>
<td>Voting</td>
<td></td>
</tr>
<tr>
<td>Term in Position:</td>
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<tr>
<td>Term on Committee:</td>
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<tr>
<td>Mr Nathan L Ho</td>
<td>YEA</td>
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<tr>
<td>P2S Engineering</td>
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<td>5000 E Spring St Ste 8</td>
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<tr>
<td>Long Beach, CA 90815-5218</td>
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<tr>
<td>Phone: (562)497-2999</td>
<td>Fax:</td>
<td></td>
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</tr>
<tr>
<td>Email: <a href="mailto:nathan.ho@p2sinc.com">nathan.ho@p2sinc.com</a></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Secretary</td>
<td>5185848</td>
<td>073</td>
<td>Non-voting</td>
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<tr>
<td>Term in Position:</td>
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<tr>
<td>Term on Committee:</td>
<td>07/01/2000</td>
<td>06/30/2023</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr John J Carter</td>
<td>CPP</td>
<td>7385 Greendale RD</td>
<td>Windsor, CO 80550-8015</td>
<td></td>
</tr>
<tr>
<td>Phone: (970)221-3371</td>
<td>Fax: (970)221-3124</td>
<td></td>
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<tr>
<td>Email: <a href="mailto:jcarter@cppwind.com">jcarter@cppwind.com</a></td>
<td></td>
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</tr>
<tr>
<td>Program Subcommittee Chair</td>
<td>8071140</td>
<td>075</td>
<td>Non-voting</td>
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<tr>
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<tr>
<td>Term on Committee:</td>
<td>02/02/2010</td>
<td>06/30/2018</td>
<td></td>
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</tr>
<tr>
<td>Dr Josephine Lau, PhD</td>
<td>Univ of Nebraska-Lincoln</td>
<td>1110 South 67th Street</td>
<td>Omaha, NE 68182-1100</td>
<td></td>
</tr>
<tr>
<td>Phone: (402)554-2079</td>
<td>Fax:</td>
<td></td>
<td></td>
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<tr>
<td>Email: <a href="mailto:jlav3@unl.edu">jlav3@unl.edu</a></td>
<td></td>
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</tr>
<tr>
<td>Research Subcommittee Chair</td>
<td>8347433</td>
<td>073</td>
<td>Voting</td>
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<td>Term in Position:</td>
<td>07/01/2019</td>
<td>06/30/2021</td>
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<tr>
<td>Term on Committee:</td>
<td>06/25/2016</td>
<td>06/30/2021</td>
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<tr>
<td>Dr Jordan D. Clark</td>
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<tr>
<td>The Ohio State University</td>
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<tr>
<td>2210 Bolz Hall</td>
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<tr>
<td>2036 Neil Ave</td>
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<tr>
<td>Columbus, OH 43210-1226</td>
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<tr>
<td>Phone: (512)585-4096</td>
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<tr>
<td>Email: <a href="mailto:clark.1217@osu.edu">clark.1217@osu.edu</a></td>
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<tr>
<td>Standards Subcommittee Chair</td>
<td>5057484</td>
<td>025</td>
<td>Voting</td>
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<td>Term in Position:</td>
<td>07/01/2019</td>
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<td>Term on Committee:</td>
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<td>06/30/2023</td>
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</tr>
<tr>
<td>Mr Steven J Emmerich</td>
<td>NIST</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>100 Bureau Dr # Ms8033</td>
<td></td>
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<tr>
<td>Gaithersburg, MD 20899-8633</td>
<td></td>
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</tr>
<tr>
<td>Phone: (301)524-1022</td>
<td>Fax: (301)975-4409</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email: <a href="mailto:sjemmerich@comcast.net">sjemmerich@comcast.net</a></td>
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</tr>
<tr>
<td>Webmaster</td>
<td>8084972</td>
<td>037</td>
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<td>07/01/2000</td>
<td>06/30/2023</td>
<td></td>
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</tr>
<tr>
<td>Mr Martin Stangl</td>
<td>RWDI</td>
<td>600 Southgate DR</td>
<td>Guelph, ON N1G 4P6 CANADA</td>
<td></td>
</tr>
<tr>
<td>Phone: 5198231311</td>
<td>Fax: 5198231316</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email: <a href="mailto:Martin.Stangl@rwdi.com">Martin.Stangl@rwdi.com</a></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Member</td>
<td>5185848</td>
<td>073</td>
<td>Voting</td>
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<tr>
<td>Term in Position:</td>
<td>07/01/2019</td>
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<td>Term on Committee:</td>
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<td>06/30/2023</td>
<td></td>
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</tr>
<tr>
<td>Mr John J Carter</td>
<td>CPP</td>
<td>7385 Greendale RD</td>
<td>Windsor, CO 80550-8015</td>
<td></td>
</tr>
<tr>
<td>Phone: (970)221-3371</td>
<td>Fax: (970)221-3124</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email: <a href="mailto:jcarter@cppwind.com">jcarter@cppwind.com</a></td>
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<table>
<thead>
<tr>
<th>Member</th>
<th>2026715</th>
<th>053</th>
<th>Voting</th>
<th>Term in Position: 07/01/2018 to 06/30/2022</th>
<th>Term on Committee: 07/01/1993 to 06/30/2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Brian A Rock, FASHRAE, PE</td>
<td></td>
<td></td>
<td></td>
<td>1143 E 1264 Rd Lawrence, KS 66047-9300</td>
<td>Phone: (785)864-3603 Fax: (785)864-5631 Email: <a href="mailto:hvacman@ku.edu">hvacman@ku.edu</a></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Member</th>
<th>733117</th>
<th>082</th>
<th>Voting</th>
<th>Term in Position: 07/01/2019 to 06/30/2021</th>
<th>Term on Committee: 07/01/2017 to 06/30/2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Steven T Taylor, PE</td>
<td></td>
<td></td>
<td></td>
<td>1080 Marina Vlg Pkwy Ste 501 Alameda, CA 94501-1142</td>
<td>Phone: (510)749-9135 Fax: (510)749-9136 Email: <a href="mailto:staylor@taylor-engineering.com">staylor@taylor-engineering.com</a></td>
</tr>
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<table>
<thead>
<tr>
<th>Provisional Corresponding Member</th>
<th>8200483</th>
<th>109</th>
<th>Non-voting</th>
<th>Term in Position: 05/14/2018 to 05/14/2020</th>
<th>Term on Committee: 05/14/2018 to 05/14/2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Akshay Bhargava</td>
<td></td>
<td></td>
<td></td>
<td>6701 Harvest Moon Ln Whitestown, IN 46075-0077</td>
<td>TRC Worldwide Engineering MEP Phone: (321) 609-1179 Fax:</td>
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<tr>
<th>Provisional Corresponding Member</th>
<th>8304112</th>
<th>163</th>
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<th>Term in Position: 05/02/2018 to 05/02/2020</th>
<th>Term on Committee: 05/02/2018 to 05/02/2020</th>
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</thead>
<tbody>
<tr>
<td>Mr Nikhillesh Singh BIST</td>
<td></td>
<td></td>
<td></td>
<td>H-57, CEPT BOYS HOTEL,GUJ. UNIVERSITY BOYS HOSTEL, NAVRANGPURA AHMEDABAD, Gujarat 380009 INDIA CEPT UNIVERSITY</td>
<td>Phone: 8800982606 Fax:</td>
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<tr>
<th>Provisional Corresponding Member</th>
<th>5184888</th>
<th>067</th>
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<th>Term in Position: 01/29/2019 to 01/29/2021</th>
<th>Term on Committee: 01/29/2019 to 01/29/2021</th>
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</thead>
<tbody>
<tr>
<td>Miss Jeanine T Bounds</td>
<td></td>
<td></td>
<td></td>
<td>PO Box 850271 Richardson, TX 75085-0271</td>
<td>Phone: (214)517-9275 Fax:</td>
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<thead>
<tr>
<th>Provisional Corresponding Member</th>
<th>8371004</th>
<th>032</th>
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<th>Term in Position: 03/06/2019 to 03/06/2021</th>
<th>Term on Committee: 03/06/2019 to 03/06/2021</th>
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<tbody>
<tr>
<td>Mr Christopher Michael Carson</td>
<td></td>
<td></td>
<td></td>
<td>105 Fern Park Dr Dawsonville, GA 30534-8405 Carson Solutions</td>
<td>Phone: 770-833-9764 Fax:</td>
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<tr>
<th>Provisional Corresponding Member</th>
<th>8138285</th>
<th>037</th>
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<th>Term in Position: 08/06/2019 to 08/06/2021</th>
<th>Term on Committee: 08/06/2019 to 08/06/2021</th>
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<tbody>
<tr>
<td>Mr Michael Craig</td>
<td></td>
<td></td>
<td></td>
<td>RWDL 600 Southgate Dr Guelph, ON N1G 4P6 CANADA</td>
<td>Phone: (519) 823-1311 Fax: 5198231316 Email: <a href="mailto:mike.craig@rwdl.com">mike.craig@rwdl.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provisional Corresponding Member</th>
<th>8333687</th>
<th>163</th>
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<th>Term in Position: 04/22/2018 to 04/22/2020</th>
<th>Term on Committee: 04/22/2018 to 04/22/2020</th>
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<tbody>
<tr>
<td>Mr Kautuk Dikshit</td>
<td></td>
<td></td>
<td></td>
<td>20, Kalindi Kunj Pipliyahana Sqaure, Ring Road Indore, Madhya Pradesh 452016 INDIA</td>
<td>Phone: 9303570700 Fax:</td>
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</tbody>
</table>

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ASHRAE Roster

VENTILATION REQUIREMENTS & 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
Mr Stephen G Ehrman, PE
AC Representatives
1300 N Pennsylvania St Ste 100
Indianapolis, IN 46202-4454
Phone: 317-500-2191 Fax: 317-921-8826
Email: steve@acequipmentreps.com

Provisional Corresponding Member
8112848 053 Non-voting
 Term in Position: 08/14/2019 to 08/14/2021
Term on Committee: 08/14/2019 to 08/14/2021
Mr Paul Grahovac
3741 Greenway Cir
Lawrence, KS 66046-5441
Phone: 785-830-7355 Fax: (888)376-3741
Email: paul.grahovac@prosoco.com

Provisional Corresponding Member
8257049 161 Non-voting
Term in Position: 01/17/2019 to 01/17/2021
Term on Committee: 01/17/2019 to 01/17/2021
Mr Hosam Abdelkader
Hassaan, Eng
Delta Construction & Manufacturing Co. (DCM)
2B,Ma’sr Elgededa Lilkisn Wattaamir
Beside Gate#3 Elshams Club
Heliopolis, Cairo 11757 EGYPT
Phone: +201148877130 Fax: +20221800212
Email: hosam.kader@dcmegypt.com

Provisional Corresponding Member
8236335 812 Non-voting
Term in Position: 07/29/2019 to 07/29/2021
Term on Committee: 07/29/2019 to 07/29/2021
Mr Darryl Joseph
19 Seepaul Blvd
Pond Street
La Romaine, TRINIDAD AND TOBAGO
Welch Morris + Associates
Phone: 8667233536 Fax:
Email: darryl.joseph21@gmail.com

Provisional Corresponding Member
8358795 215 Non-voting
Term in Position: 09/06/2018 to 09/06/2020
Term on Committee: 09/06/2018 to 09/06/2020
Mr Tushar Kalra
Camfil Air Filtration India Pvt. Ltd.
82, IDC
Mehrauli Road
Gurgaon, Haryana 122001 INDIA
Phone: (852) 750-1119 Fax:
Email: tushar.kalra@camfil.com

Provisional Corresponding Member
8210525 142 Non-voting
Term in Position: 05/23/2018 to 05/23/2020
Term on Committee: 05/23/2018 to 05/23/2020
Mr Mitesh Kumar
YEA
BLK 511, Pasir Ris St 52, #09-135
Singapore, 510511 SINGAPORE
ORISON QEHS LLP
Phone: 65 83685878 Fax: 65 64819429
Email: miteshkumar84@gmail.com

Provisional Corresponding Member
8352759 016 Non-voting
Term in Position: 03/20/2018 to 03/20/2020
Term on Committee: 03/20/2018 to 03/20/2020
Ms Tian Ma
YEA
36 Pond Dr
Thornhill, ON L3T 7V3 CANADA
Seneca College
Phone: (647) 970-4789 Fax:
Email: mt323hahaha@gmail.com

Provisional Corresponding Member
8355717 032 Non-voting
Term in Position: 10/17/2018 to 10/17/2020
Term on Committee: 10/17/2018 to 10/17/2020
Mr Matt D Mason PE
YEA
811 Woodmont Dr
Marietta, GA 30062
MAXAIR Mechanical, Inc
Phone: 423-838-4176 Fax:
Email: mattmason777@gmail.com

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ASHRAE Roster

VENTILATION REQUIREMENTS & 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
4500 Royale Dr
Tuscaloosa, AL 35406-4410
The University Of Alabama
Phone: (205)348-6982 Fax:
Email: zhengoneill@gmail.com

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
CPP Wind Engineering
7365 Greendale Rd
Windsor, CO 80550-8015
Phone: 970-233-5000 Fax:
Email: ryan.parker@cppwind.com

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
Command Commissioning
201 W 5th ST Ste 1100
Austin, TX 78701-0060
Phone: (512)294-6740 Fax:
Email: PanamFern@hotmail.com

Provisional Corresponding Member
8282868 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
GreenTree Global
808, Goodwill Infinity, Sector-12
Kharghar, Navi Mumbai
Mumbai, 410210 INDIA
Phone: (878) 984-7037 Fax:
(+91)
Email: sahilpriyadarshi.1925@gmail.com

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
National Energy Management Institute (NEMI)
8403 Arlington Blvd
Ste 103
Fairfax, VA 22031-4662
Phone: (916) 283-6281 Fax:
Email: cruch@nemiconline.org

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
1108 Kennedy Tr
Chesapeake, VA 23322-6947
Phone: 757-639-6924 Fax:
Email: david.a.schaeffer@navy.mil

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
DMG North, Inc.
4796 Heyer Ave
Castro Valley, CA 94546-3610
Phone: (415)859-8345 Fax:
Email: isaac.simpson@dmgm.com

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
853 Westminster Dr
Lancaster, PA 17601-1453
Armstrong World Industries Inc.
Phone: (717)917-5949 Fax:
Email: gsrdeshpande@armstrongceilings.com

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<table>
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<th>Name</th>
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<tr>
<td>Mr Brandon Michael Svitak</td>
<td>YEA</td>
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<td>01/02/2020 to 01/02/2022</td>
<td>01/02/2020 to 01/02/2022</td>
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<td>04/22/2019 to 04/22/2021</td>
<td>04/22/2019 to 04/22/2021</td>
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<tr>
<td>Mr VINOD VENUGOPAL</td>
<td>YEA</td>
<td>Non-voting</td>
<td>04/20/2019 to 04/20/2021</td>
<td>04/20/2019 to 04/20/2021</td>
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<tr>
<td>Mr R Vijayakumar, PhD</td>
<td></td>
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<td>01/09/2019 to 01/09/2021</td>
<td>01/09/2019 to 01/09/2021</td>
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<tr>
<td>Ms YU YUAN</td>
<td></td>
<td>Non-voting</td>
<td>04/12/2019 to 04/12/2021</td>
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ASHRAE Roster

VENTILATION REQUIREMENTS & 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
Malikha Housing Bnk12,Room21
ThinGunGyun, 11011 MYANMAR
AA. Medical
Phone: (95)9968876622 Fax:
Email: zayzay681@gmail.com

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
Phone: (202) 402-5728 Fax: (202)706-5873
Email: michael.d.blanford@hud.gov

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
Long Beach, CA 90815-5218
P2S Engineering
Phone: (310)647-7432 Fax:
Email: trevor.zeller@p2sinc.com

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 Boone, IV, P.Eng, PE
1625 Horby St Apt 702
Vancouver, BC V6Z 2M2 CANADA
NDY-TETRA Tech Co.
Phone: 604 290-6194 Fax:
Email: aboome@aboelt.com

Corresponding Member
8138982 999 Non-voting
Term in Position: 07/01/2016 to
Term on Committee: 02/12/2015 to 06/30/2016

Ms Elizabeth Christine Balke YEA
Taylor Engineering
1080 Marina Vlg Pkwy Ste 501
Alameda, CA 94501-1142
Phone: (218) 780-8065 Fax:
Email: ebalke@taylor-engineering.com

Corresponding Member
5116450 064 Non-voting
Term in Position: 07/01/2005 to
Term on Committee: to

Lance R Brown YEA
3607 La Mirada Dr
Concord, CA 94519-1413
Google
Phone: (801)309-1175 Fax:
Email: lancebrown@customs@gmail.com

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:
Email:

Ms Heather L Camden
E&C Engineers And Consultants Inc
1010 Lamar St Ste 650
Houston, TX 77002-6324
Phone: 713-580-8800 Fax: (713)580-8888
Email: camden@eceng.com

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ASHRAE Roster

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

As of Any Date

Corresponding Member
113108  104  Non-voting
Term in Position:  07/01/2006 to 06/30/2006
Term on Committee:  07/01/1996 to 06/30/2006
Mr Bernardo Cardenal, PE
20555 Sausalito Dr
Boca Raton, FL 33498-6704
Rocamar Engineering Services Inc
Phone: (561)276-9898  Fax: (561)431-5865
Email: Bernardoc@rocamareng.com

Corresponding Member
5013789  999  Non-voting
Term in Position:  07/01/1997 to 06/30/2006
Term on Committee:  to
Dr Qingyan (Yan) Chen
Purdue University
585 Purdue Mall
West Lafayette, IN 47907-2088
Phone: (765)496-7562  Fax: (765)496-7534
Email: yanchen@purdue.edu

Corresponding Member
5182029  073  Non-voting
Term in Position:  07/01/2016 to 06/30/2016
Term on Committee:  06/29/2015 to 06/30/2016
Mr Brad C Cochran
C P Inc
7365 Greendale RD
Windsor, CO 80505-8015
Phone: (970)221-3371  Fax: (970)221-3124
Email: bcochran@cppwind.com

Corresponding Member
5018335  113  Non-voting
Term in Position:  07/01/2004 to 06/30/2004
Term on Committee:  to
Mr Leonard A Damiano
104 Creek Valley Ter
Smithville, MO 64089-9258
Retired
Phone: 843-655-0037  Fax: (843) 655-0037
Email: damiano.len@gmail.com

Corresponding Member
8225389  032  Non-voting
Term in Position:  07/01/2017 to 06/30/2017
Term on Committee:  07/26/2016 to 06/30/2017
Dr Danko Davidovic
Huber Engineered Woods LLC
1446 Hwy 336
Commerce, GA 30530
Phone: 706-621-0795  Fax:
Email: danko.davidovic@huber.com

Corresponding Member
5203312  004  Non-voting
Term in Position:  07/01/2007 to 06/30/2007
Term on Committee:  to
Mr Darryl W DeAngelis
149 Burbank Rd
Longmeadow, MA 01106-1503
EBTRON
Phone: (203) 617-9235  Fax: (203)749-3829
Email: darryld@ebtron.com

Corresponding Member
8103496  022  Non-voting
Term in Position:  04/23/2017 to 04/22/2017
Term on Committee:  04/23/2015 to 04/22/2017
Dr Jason W DeGraw
6319 Iris Way
Arvada, CO 80004-5157
ORNL
Phone: (814)321-8051  Fax:
Email: jason.degraw@gmail.com

Corresponding Member
5150823  021  Non-voting
Term in Position:  07/01/2006 to 06/30/2006
Term on Committee:  to
Dr Gregory Dobbs, PhD,
LEED AP BEMP HPDP
BESA
4 Delmore Dr
Kendall Park, NJ 08824-7015
Phone: (732)419-3050  Fax: (815)301-3061
Email: greg.dobbs@mail.ashrae.org

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<th>Corresponding Member</th>
<th>5200188</th>
<th>026</th>
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<td>Term on Committee:</td>
<td>07/01/2007 to 06/30/2012</td>
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<tr>
<td><strong>Mr William S Dols</strong></td>
<td>Natl Inst Of Standards &amp; Technology</td>
<td></td>
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<tr>
<td>100 Bureau Dr Stop 8633</td>
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<tr>
<td>Gaithersburg, MD 20899-8633</td>
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<tr>
<td>Phone: (301)975-5860 Fax: (301)975-4409</td>
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</tr>
<tr>
<td>Email: <a href="mailto:william.dols@nist.gov">william.dols@nist.gov</a></td>
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<th>5070363</th>
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<tr>
<td><strong>Mr Stephen W Duda, PE</strong></td>
<td>Ross &amp; Baruzzini Inc</td>
<td></td>
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</tr>
<tr>
<td>6 S Old Orchard Ave</td>
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<tr>
<td>Saint Louis, MO 63119-3203</td>
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</tr>
<tr>
<td>Phone: (314)918-8383 Fax: (314)918-1766</td>
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</tr>
<tr>
<td>Email: <a href="mailto:sduda@rossbar.com">sduda@rossbar.com</a></td>
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<tr>
<td><strong>Dr Javad Esmaeilpanah</strong></td>
<td>YEA</td>
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<tr>
<td>101 Springhead Gdns</td>
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<tr>
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<td>RWDI Inc.</td>
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<tr>
<td>Phone: (647) 830-8093 Fax:</td>
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<tr>
<td>Email: <a href="mailto:jen@rwdi.com">jen@rwdi.com</a></td>
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<tr>
<td><strong>Ms Xia Fang</strong></td>
<td>McKinstry</td>
<td></td>
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<tr>
<td>16025 Tbd Mtn Pkwy Ste 100</td>
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<tr>
<td>Golden, CO 80403-1694</td>
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<tr>
<td>Phone: (720)577-2002 Fax:</td>
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<tr>
<td>Email: <a href="mailto:fangxia6@gmail.com">fangxia6@gmail.com</a></td>
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<tr>
<td><strong>Dr Helmut E Feustel</strong></td>
<td>Lahnstrasse 48</td>
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<td>D-35435 Wettenberg, GERMANY</td>
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<td>Kessler &amp; Luch GmbH</td>
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<tr>
<td>Phone: 496418772012 Fax: 11496418772137</td>
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<tr>
<td>Email: <a href="mailto:hefeustel@lfga-feustel.de">hefeustel@lfga-feustel.de</a></td>
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<tr>
<td><strong>Mr Todd D Friedman</strong></td>
<td>11709 Fulham St</td>
<td></td>
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<tr>
<td>Silver Spring, MD 20902-3015</td>
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<tr>
<td>Friedman Engineering, LLC</td>
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<tr>
<td>Phone: (301) 298-5070 Fax:</td>
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<tr>
<td>Email: <a href="mailto:tfriedman@friedmaneng.com">tfriedman@friedmaneng.com</a></td>
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<tr>
<td><strong>Ms Dianne M Griffiths, PE</strong></td>
<td>Steven Winter Associates</td>
<td></td>
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</tr>
<tr>
<td>61 Washington St Ste 1</td>
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<tr>
<td>Norwalk, CT 06854-2739</td>
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</tr>
<tr>
<td>Phone: (203)857-0200 Fax: (203)852-0741</td>
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<tr>
<td>(274)</td>
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<tr>
<td>Email: <a href="mailto:dgriffiths@swinter.com">dgriffiths@swinter.com</a></td>
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<tr>
<td><strong>Mr Richard A Grot</strong></td>
<td>674 Dayridge Dr</td>
<td></td>
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<tr>
<td>Dripping Springs, TX 78620-2127</td>
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<tr>
<td>Lagos Applied Technology</td>
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<tr>
<td>Phone: (301)529-3845 Fax: (760)480-1435</td>
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<tr>
<td>Email: <a href="mailto:ragnol@tracergas.com">ragnol@tracergas.com</a></td>
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ASHRAE Roster
VENTILATION REQUIREMENTS & 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 Haghighat
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5012232  999  Non-voting
Term in Position: 07/01/1993 to
Term on Committee: to

Prof Shinsuke Kato, PhD
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Chiyoda-Ku
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8071140  075  Non-voting
Term in Position: 07/01/2018 to
Term on Committee: 02/02/2010 to 06/30/2018

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Email: jlaus3@unl.edu

Corresponding Member
3034586  206  Non-voting
Term in Position: 07/01/2011 to
Term on Committee: 07/01/1989 to 06/30/2011

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Email: mwliddament@gmail.com

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8223536  026  Non-voting
Term in Position: 07/01/2016 to
Term on Committee: 04/01/2014 to 06/30/2019

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Email: slight@building-dynamics.com

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8312229  109  Non-voting
Term in Position: 07/12/2017 to
Term on Committee: to

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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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Civil and Environmental Engineering
Worcester Polytechnic Institute
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Phone: (512)965-0863  Fax:
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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

Dr Joseph W Lstiburek
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ASHRAE Roster

VENTILATION REQUIREMENTS & 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
Dr Iain A MacDonald
National Research Council Canada
1200 Montreal Road
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Email: iain.macdonald@nrc-cnrc.gc.ca

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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Oak Ridge, TN 37831-2008
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Email: malhotram@ornl.gov

Corresponding Member
8217852 082 Non-voting
Term in Position: 09/13/2017 to
Term on Committee: to
Mr Dennis W Mathes
Lomanco, Inc.
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Jacksonville, AR 72076-4247
Phone: (501)983-6162 Fax:
Email: dmathes@lomanco.com

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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Email: cmaurer@advancedenergy.org

Corresponding Member
508536 082 Non-voting
Term in Position: 07/01/2008 to
Term on Committee: 07/01/2003 to 06/30/2008
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Email: mpmoder@ucdavis.edu

Corresponding Member
8147850 999 Non-voting
Term in Position: 07/01/2016 to
Term on Committee: 04/01/2014 to 03/31/2016
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Email: bryanm@mckinstry.com

Corresponding Member
5012230 506 Non-voting
Term in Position: 07/01/1997 to
Term on Committee: to
Mr Shuzo Murakami
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Kohoku-ku
Yokohama, 223-8522 JAPAN
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Email: murakami@sd.keio.ac.jp

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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Asheville, NC 28804-1733
Phone: (828)337-2317 Fax: 828-253-8347
Email: amy@vandemusser.com

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<tr>
<td>3437 E Winona St</td>
<td>Phoenix, AZ 85044-3634</td>
</tr>
<tr>
<td>Phone: (619)972-3345</td>
<td>Fax: (619)817-8311</td>
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<tr>
<td>Email: <a href="mailto:victor@labexhaust.com">victor@labexhaust.com</a></td>
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<td>Mr Victor A Neuman, PE</td>
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<tr>
<td>Dr Ronald L Petersen</td>
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<tr>
<td>Petersen Research and Consulting LLC</td>
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<tr>
<td>1003 Pinnacle Pl</td>
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<tr>
<td>Fort Collins, CO 80525-6720</td>
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<tr>
<td>Phone: (970) 690-1344 Fax: (970) 226-2245</td>
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<tr>
<td>Email: <a href="mailto:rpetersen@petersenresearch.com">rpetersen@petersenresearch.com</a></td>
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<td>Mr Donald Prather</td>
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<tr>
<td>Mr Michael A Ratcliff</td>
<td></td>
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<tr>
<td>1516 N University St</td>
<td></td>
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<tr>
<td>Redlands, CA 92374-2806</td>
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<td>RWDI LLC</td>
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<tr>
<td>Phone: (909)269-6057 Fax: (519)823-1316</td>
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<td>Email: <a href="mailto:mar@rdw.com">mar@rdw.com</a></td>
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<tr>
<td>Mr Anil Parekh, M.A.Sc., PEng</td>
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<tr>
<td>Natural Resources Canada</td>
<td></td>
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<tr>
<td>1 Haanel Drive</td>
<td></td>
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<tr>
<td>Building 3 -212B</td>
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</tr>
<tr>
<td>Ottawa, ON K1A 1M1 CANADA</td>
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</tr>
<tr>
<td>Phone: (613)947-1959 Fax: (613)966-9909</td>
<td></td>
</tr>
<tr>
<td>Email: <a href="mailto:anil.parekh@canada.ca">anil.parekh@canada.ca</a></td>
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ASHRAE Roster

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

As of Any Date

Corresponding Member
630787  001  Non-voting
Term in Position: 07/01/2004 to
Term on Committee: to

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2050731  049  Non-voting
Term in Position: 07/01/2007 to
Term on Committee: to

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Email: wryan@uic.edu

Corresponding Member
5023887  Non-voting
Term in Position: 07/01/1994 to
Term on Committee: 07/01/1990 to 06/30/1994

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Phone: (703)820-7696  Fax: (703)671-8350
Email: 

Corresponding Member
8102505  085  Non-voting
Term in Position: 07/01/2015 to
Term on Committee: 04/01/2014 to 06/30/2015

Mrs Heather R Schopplein PE
8837 Carmir Dr
Santee, CA 92071-3903
UMEIC
Phone: (707)318-4307  Fax: Not applicable
Email: hschopplein@gmail.com

Corresponding Member
2043954  037  Non-voting
Term in Position: 07/01/1997 to
Term on Committee: to

Mr Glenn D Schuyler
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RWDF
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VENTILATION REQUIREMENTS & INFILTRATION-T-TAC-TC04.03
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<tr>
<td>Prof Xudong Yang</td>
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<td>Tsinghua University</td>
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<td>07/01/2017 to 06/30/2020</td>
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Appendix B: CEC Update
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

A full list of ASHRAE conferences and program details is available at [https://www.ashrae.org/conferences](https://www.ashrae.org/conferences).
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.

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
CIBSE ASHRAE Technical Symposium 2020
Organized by CIBSE and ASHRAE, Glasgow, Scotland, April 16-17, 2020 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

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

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

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.