

ASHRAE TC 2.6 Sound and Vibration Control

Main Committee Meeting Minutes

2:30 PM – 4:30 PM EDT Monday June 27, 2022

Annual Conference

NOTE: All Task Group Chairs and Subcommittee Chairs are asked to submit written report to the Secretary (Paul Bauch) before Friday July 1st, 2022

1. Call to order (Saenz-Acosta)

- 1.1. Read scope of TC 2.6: TC 2.6 is concerned with the fundamental scientific and engineering principles of sound and vibration, particularly as applied to the design and performance of the built environment.
- 1.2. ASHRAE Code of Ethics statement: "The ASHRAE Code of Ethics is to be adhered to by those doing ASHRAE business whether or not they are an ASHRAE member (www.ashrae.org/about-code-of-ethics)."
- 1.3. Additions and/or modifications to the agenda

2. Introduction of those present (Saenz-Acosta)

- 2.1. Welcome new members and visitors

3. Confirmation of current voting members

- 3.1. 11 members, 10 members present

4. Review and approval of the minutes (Saenz-Acosta)

- 4.1. Steve Wise (1st), Matthew Golden (2nd)

5. Secretary's report (Bauch)

6. TC Chair's meeting report (Saenz-Acosta)

- 6.1. New online Roster changes, if you are not a member of TC 2.6 please go to our website: <https://tc0206.ashraetcs.org/membership.php>
- 6.2. New members were asked to join at the ASHRAE TC 2.6 website.

7. ASHRAE Liaison

- 7.1. Section Head – Jon Cohen
- 7.2. Research
- 7.3. Publications

8. Chair's announcements and correspondence (Saenz-Acosta)

- 8.1. 2022-2023 Chair, Karina Saenz-Acosta
- 8.2. 2022-2023 Vice Chair, Paul Bauch
- 8.3. 2022-2023 Secretary, Brandon Cudequest

9. Subcommittee reports (written reports to be provided to Secretary)

- 9.1. **Research Subcommittee** (Meeuwsen)
 - 9.1.1. Research Chair's meeting report
 - 9.1.2. Work Statements/RTAR's/URP's
 - 9.1.2.1. RP 1707 - Annoyance Thresholds of Tones in Noise as Related to Building Services Equipment
 - 9.1.2.2. RP 1852 - Develop performance metric, criteria, and process to measure and predict of speech privacy in High Performance Buildings
 - 9.1.2.3. RTAR 1919 - The Effects of Duct Size and Aspect Ratio on Flow Noise in Elbows
 - 9.1.2.4. RTAR 1882 - Procedure for Estimating Occupied Space Sound Levels in the Application of UFAD Air Terminals and Air Outlets
 - 9.1.3. Topics for future research

9.2. Programs Subcommittee (Swan)

9.2.1. Program Chair's meeting report

9.2.2. Programs this meeting

9.2.2.1. Seminar 17: *How to Select and Size HVAC Fans for Optimum Acoustical Performance*

Monday, June 27th, 8:00 AM – 9:30 AM EDT

9.2.3. Programs at Atlanta 2023

9.3. Publications Subcommittee (Wise)

9.3.1. Handbook chapters

9.3.1.1. Handbook Applications 2023 (Wise)

9.3.2. Other publications

9.4. Web page (Saenz-Acosta)

9.5. Standards Subcommittee (Bridger)

9.5.1. ASHRAE

9.5.1.1. PMP

9.5.1.2. Standard 189.1

9.5.2. Updates from Other Standards Organizations

9.5.2.1. AHRI (Marks)

9.5.2.2. AMCA (Brooks)

9.5.2.3. ANSI (Reuter)

9.5.2.4. ASTM E33 (Lilly/Shaffer)

9.5.2.5. ISO (Golden)

9.5.2.6. WELL/LEED/ICC

9.6. Standing Subcommittees [10 minutes]

9.6.1. Vibration Isolation (Miller-Klein)

9.7. Operations Subcommittee (Saenz-Acosta) [15 minutes]

9.7.1. Honors and awards

9.7.2. Long range planning

9.7.3. Membership

9.7.3.1. Rolling off: Steve Wise, Curtis Eichelberger, Reginald Keith, Roman Wowk

9.7.3.2. Rolling on: Brandon Cudequest, Kay Hatlestad, Michael Dick

9.7.4. Liaisons (Saenz-Acosta)

9.7.4.1. ASHRAE TC 2.1 Physiology and Human Environment (Eichelberger)

9.7.4.2. ASHRAE TC 2.7 Seismic, Wind and Flood Resistant Design (Waters)

9.7.4.3. ASHRAE TC 5.1 Fan Design and Application (Osborn)

9.7.4.4. ASHRAE TC 5.2 Duct Design (Hassler)

9.7.4.5. ASHRAE TC 5.3 Room Air Distribution (Zimmerman)

9.7.4.6. ASHRAE TC 9.6 Healthcare (Koukounian)

9.7.4.7. ASHRAE TC 9.7 Educational Facilities

9.7.4.8. ASHRAE TC 9.8 Indoor Agriculture

9.7.4.9. ASA (Reuter)

9.7.4.10. VISCMA (Waters)

9.7.4.11. Others: INCE/InterNoise (Golden), NCAC (Bridger), EGSA (Simmons), etc...

10. New business/Old business [5 minutes]

11. Next meeting date and location – Atlanta, GA February 4 – February 8, 2023

12. Adjournment

Research project status:

RP-1707 - Annoyance Thresholds of Tones in Noise as Related to Building Services Equipment

- Project is complete, final report and papers submitted, TC vote conducted
 - Results 11-0-0-0
- PMS chaired by Kim Osborne. Jerry Lilly presented a Hot Topic on the software yesterday.

RP-1852 - Develop performance metric, criteria, and process to measure and predict speech privacy in High Performance Buildings

- Contract awarded to Soft dB Acoustical Consulting, Roderick Mackenzie principal investigator.
- Much work has been completed, after several delays due to inability to make measurements in occupied spaces under COVID-19.
- PMS chair is Erik Miller-Klein.
- Roderick gave a status report in the subcommittee meeting, and also presented a Hot Topic on results to date.

RTAR-1919 - The Effects of Duct Size and Aspect Ratio on Flow Noise in Elbows

- The WS is approved by RAC and is in line for funding, tentatively scheduled to bid in Fall of 2022.
- Brandon Cudequest is lead author.
- The PES was set, Brandon Cudequest, Jerry Lilly, Jeff Boldt, and Pat Brooks from SMACNA.

RTAR - Procedure for Estimating Occupied Space Sound Levels in the Application of UFAD Air Terminals and Air Outlets

- RTAR 1882 was started by TC 5.3, with TC 2.6 as co-sponsor, approved by RAC several years ago, but little progress was made on a work statement, and it dropped off RAC's list.
- Work on the RTAR has restarted, with Nick Searle from Titus as lead author of the RTAR, Chris Burroughs and Greg Meeuwssen participating.
- Nick presented the outline of current draft in presentation form, with lots of discussion. The draft will be updated, and circulated to the full TC for comment and also for RAC liaison review.

News from Research Chairs Breakfast

Budget this society year was \$1.8M, and only already active projects were funded. Donations have improved, budget next year expected to be near the normal \$2.6-2.7M. Currently active projects total \$8.7M.

8 projects released for bid in May, expect 8-10 more released in the fall.

1. PMSc meetings are open to the Public. (Results should not be released or discussed outside of the TC until the final report is delivered and approved). Make sure you are PUBLISHING a meeting time for your Research Project Monitoring Subcommittees (TC chair, PMS chair)
2. Make sure your PMSc meeting is listed in the conference program. Ensure that Mike Vaughn and your RL are invited to all PMSc meetings as they are ex-officio members of the PMS.
3. Ensure that the PMSc Chair is keeping the TC informed of their progress—Minutes of the PMS should include a summary of your report to the TC

ASHRAE TC 2.6 Sound and Vibration

PROGRAMS SUBCOMMITTEE MINUTES – 2022 Annual Meeting, Toronto, Ontario – Sunday 26 June 2022

1. Overview of types of programs
2. Promoted this meeting's programs
3. Doodle poll update for future programs, to be redone this year in October. Let Jason know of any topics to add.
4. Finalised plans for the next meetings' programs in Atlanta, February 2023. Three to be worked up to submit.
5. Discussed plans for the following meetings in Tampa 2023 and Chicago 2024, but new Doodle poll will affect this.

TYPES OF PROGRAM SESSIONS (with links)

Technical Paper

More rigorous, detailing research/theory
Maximum of 30 double-spaced text pages, not including references and up to 12 figures
Author submits directly, no abstract required, at least 9 months prior to the meeting
3 reviewers: double-blind, commercialism
Present: poster, or oral if grouped with related
Published in Transactions and recorded
[Authors' Manual](#)

Conference Paper/Extended Abstract

Less rigorous, can be on case studies
Maximum of 8 pages (3 pages for EAs), includes text, tables, figures, not references
Submitted directly by author, or by TC
abstract 10 months prior to meeting
paper 6 months prior
2 reviewers: single blind, commercialism
Present: oral, which is recorded
[Conference paper template](#)

ASHRAE asks for reviewers periodically

Seminar/Workshop/Forum

Session chairs and speakers selected by TCs
Program submitted by session chair/speakers
Include bios, abstracts, learning objectives, example questions/answers
Speakers submit final presentations 1 month prior to meeting for commercialism review

Seminar

60 minutes: 1 – 3 presentations
90 minutes: 3 – 4 presentations

Workshop

One chair and two presenters (maximum)
30 minutes for presentations
30 minutes for discussion

Debates

Experts (team/individual) present 2 sides
Hot button issues

Forum/Panel

One moderator
60-minute length
No presentations
Not recorded, 'off the record'

Hot Topic

Internal subcommittee presentation
Can be invited from outside TC 2.6
Listed in the ASHRAE schedule
Available to both TC 2.6 and larger organization
Speakers can be video-conferenced (ie, no registration fee)

**** ASHRAE encourages use of their approved PowerPoint template for presentations; available on their website ****

THIS MEETING:
Toronto, 25-29 June 2022

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Research Summit
- 4: Connected Buildings, Connected Communities
- 5: Cold Climate Bldg: Design/Operation/Resilience
- 6: Sustainable Bldg: IAQ/Energy Use/Comfort/Health
- 7: Professional Development and Education
- 8: Buildings in the Aftermath of COVID-19

Seminars/Paper Sessions:

Seminar 17: *How To Select and Size HVAC Fans for Optimum Acoustical Performance* (Track 2)
Monday 27 June 2022, 8:00-9:30 AM, Sheraton, Dominion South (2)

1. Basics of Fan Noise and Application Considerations
Rad Ganesh, Twin City Fan & Blower
2. Fan Noise in Air Handling Systems
Paul Bauch, Johnson Controls
3. 20/20 Foresight: Choosing the Right Fan for the Job (case studies)
Jerry Lilly, JGL Acoustics

Conference Paper Session 14: Solar Powered Solutions for Supporting Building Operations (unrelated to TC 2.6, has noise assessment for outdoor air duct exposed to solar for preheating)
Tuesday 28 June '22, 9:45-10:45 AM, Sheraton C

Hot Topics:

Tones and Background Noise (RP-1707)?
Software demonstration (Lilly) [Tied for 4th]

NEXT MEETING:
Atlanta, 4-8 February 2023

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Refrigeration & Refrigerants
- 4: Grid Resilience & Thermal Storage
- 5: Zero Energy Emissions & Decarbonization
- 6: Multifamily and Residential Buildings
- 7: Operations & Maintenance
- 8: Construction: Building Simulation/Virtual Design
- 9: Supply Chain challenges: Innovative responses

Seminars/Workshops/Forums:

Proposals due: Tuesday 9 August 2022 (↑↓ 10 Oct 22)

Chose three to work up to submit:

Track 2: Duct Noise Breakout (Lilly/Peterman)
Tied for 2nd, 15 votes, Jerry's INCE paper
David Herrin modelling, Intensity msmts

Track 2: Tunnel/ Underground ventilation (LaForgia) with TC 5.1

Track 5/6: Multifamily/Residential Acoustics (Miller-Klein, Swan Eichelberger/ Marks chair) Water/ Air Source Heat Pumps? Acoustic impact of designing for high performance/ decarbonization

Technical/Conference Papers:

5 Apr 22: Conference abstracts, Tech Papers, Paper Session Requests Due (Abstracts ↑↓ 26 Apr 22)
25 Jul 22 Conference Papers due

TP: Tones and Background Noise (RP-1707)
Tied for 4th

Hot topics:

WELL certification acoustics (Miller-Klein/Bourdeau)?
Updated standards/codes

FOLLOWING MEETINGS:
Tampa, 24-28 June 2023

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Research Summit
- 4:

Seminars/Workshops/Forums:

Proposals due: Early 2023 (↑↓ XX April 23)

Track X: Rooftop Systems (Peterman)
Tied for 4th, 14 votes

Track X: Pitfalls/Measuring success – Acoustics issues to get you sued? Why consultants? Attorney? (Boldt: Lilly)

Track X: Prediction v Lab v Field (Wowk/ Papadimos/ Marks, Miller-Klein): Polled 6th, 12 votes (or 1st, 18 votes), attenuators [polled 2nd], validation, acoustic cameras, ways to improve

Track X: Workshop: Upcoming changes to the Vibration Table (Meeuwssen, Miller-Klein, Wise, Golden, Wowk) Why changing. The theoretical, the practical, the metrics.

Technical/Conference Papers:

XX Sep 22: Conference abstracts, Tech Papers, Paper Session Requests Due (Abstracts ↑↓ XX Sep 22)
XX Dec 22 Conference Papers due

Hot topics:

[?]

Future:

Chicago 20-24 Jan 24 / **Indianapolis** 22-26 Jun 24
Orlando 8-12 Feb 2025 / **Phoenix** 21-25 Jun 2025

TOPICS FOR FUTURE PROGRAMS

Series: Equipment Noise

- 17 Fan Selection for Acoustics (Schaffer)
- 15 Duct Breakout Noise (Lilly/Peterman)
- 15 Silencers: Performance v Design (Papadimos)
- 14 Rooftop systems (Peterman)
- 9 Fan Boxes: above/below floor (Zimmerman)
- 6 Air Distribution Systems (Zimmerman)
- 3 Compressors: Frequency Characteristics ()
- 3 Ductless Systems: PTACs, WSHP (Weinstein)
- 2 Electrical: Xfmrs, Elec Motors (Papadimos)
- 2 Plumbing noise (Wowk) TC 6.1/6.6?
- 2 Small Fan Coils ()
- 2 Under-floor Air Systems (Reynolds)
- 1 Boilers (Marks)
- 1 DOAS units (Peterman)
- 1 Generators (LaForgia)
- 0 Fume hoods
- 0 Industrial Ventilation ()
dust collection, garages, LNG
- 0 Pumps ()
- 0 Refrigeration: Commercial/Transport (Marks)
- 0 Tankless water heaters

Format:

1. What it is, types, how works, why noisy
2. Standards, specification, lab data, mitigation methods
3. Field issues, case studies, testing

Series: Basics of HVAC Noise

- 14 Tones and Fluctuations (Lilly)
- 12 Prediction vs Lab vs Field (Papadimos/Marks)
- 7 Speech Privacy in Low Noise Offices ()
- 6 Predicted vs Actual Noise (Papadimos)
- 5 Noise Flanking Paths (Peppin)
- 4 How Noise Affects Design Process (Lilkendy)
- 3 Room Msmt: Test Method (Rockwood)
- 2 Commissioning ()
- 2 Effects of 'over-design' (Lilly)
- 2 Noise and Productivity (Wang)
- 2 Noise Calculations How To (CD?) (Peterman)
- 0 Applications Chapter Review ()

Workshop

Vibration Handbook Table: Debate on where to take in future? Get feedback

Hot Topics

How to apply the results of RP-1707 on Tones? Indoors/Outdoors? To products?

New Topics to add to the poll?

VRF/electrical systems, movement to lower carbon equipment
Water Source Heat Pumps
Tones: Incorporating into criteria

Other Topics:

- 9 Classrooms: ICC adopts S12.60 (Bridger)
- 9 Noise Fluctuations (Lilly)
- 8 Performance Rated Buildings (Roy)
- 5 Passive vs Active (Wise)
- 4 Design of Healthcare Facilities (Miller-Klein)
Alarm fatigue, FGI Guidelines, Privacy
Team up with healthcare TCs?
- 3 Standard Test: Seismic Devices (w/2.7)
- 3 Industrial noise (Keith)
- 3 Noisy kit near to occupied?
- 3 Shell & Core vs Tenant Fit-Out/Improvement
- 2 Tunnel Ventilation (LaForgia)
- 1 Labs internal: Air Valves/Fume Hoods (Wouk)
- 1 Labs external: Stacks, ventilation, nozzles
- 0 Mission Critical Facilities ()

Past Items:

- 4 Plenum array fans
- 1 *Hearing protection: TWA, Hospitals, Escape / S/N / STI, WHO*
- 0 Refrigerated processes/Storage (Swan offered Keith's talk to TC10.5)

[Contact other TCs that may want to team up]

RESULTS of DOODLE POLL (Spring 2021, redo in Spring 2022?)

34 participants, 208 votes

17 votes

Equipment: Fan Selection for Acoustics (Schaffer)

15 votes

Equipment: Duct Breakout Noise (Lilly/Peterman)

Equipment: Silencers: Performance v Design (Papadimos)

14 votes

Equipment: Rooftop systems (Peterman)

Basics: Tones and Fluctuations (Lilly)

12 votes (technically 18 votes)

Basics: Prediction vs Lab vs Field (Papadimos/Marks/Miller-Klein) **

9 votes

Equipment: Fan Boxes: above/below floor, VAV, CAV, VFD (Zimmerman)

General: Classrooms: ICC adopts S12.60 (Bridger)

General: Noise Fluctuations (Lilly)

8 votes

General: Performance Rated Buildings (Roy)

7 votes

Basics: Speech Privacy in Low Noise Offices ()

6 votes

Equipment: Air Distribution Systems (Zimmerman)

Basics: Predicted vs Actual Noise (Papadimos) **

5 votes

General: Passive vs Active (Wise)

Basics: Noise Flanking Paths (Peppin)

4 votes

Equipment: Plenum array fans

General: Healthcare Facilities: Design, Alarm fatigue, FGI Guidelines, Privacy (Miller-Klein)

Basics: How Noise Affects Design Process (Lilkendy)

3 votes

Equipment: Compressors: Frequency Characteristics ()

Equipment: Ductless Systems: PTACs, WSHP (Weinstein)

General: Industrial noise (Keith)

General: Noisy equipment near to occupied

General: Seismic Devices: Standard Test (w/2.7)

General: Shell & Core vs Tenant Fitout/Improvement

Basics: Room Measurement: Test Method (Rockwood)

2 votes

Equipment: Electrical: Transformers, Elec Motors (Papadimos)

Equipment: Plumbing noise (Wowk) TC 6.1/6.6?

Equipment: Small Fan Coils ()

Equipment: Under-floor Air Systems (Reynolds)

General: Tunnel Ventilation (Laforgia)

Basics: Commissioning ()

Basics: Effects of 'over-design' (Lilly)

Basics: Noise and Productivity (Wang)

Basics: Noise Calcs/How To (CD) (Peterman)

1 vote

Equipment: Boilers (Marks)

Equipment: DOAS units (Peterman)

Equipment: Generators (LaForgia)

General: Labs internal: Air Valves/Fume Hoods (Wouk)

General: Labs external: Stacks, ventilation, nozzles

General: Hearing protection: TWA, Hospitals, Escape / S/N / STI, WHO

0 votes

Equipment: Fume hoods

Equipment: Industrial Ventilation (), dust collection, garages, LNG

Equipment: Pumps ()

Equipment: Refrigeration: Commercial/Transport (Marks)

Equipment: Tankless water heaters

General: Mission Critical Facilities ()

General: Refrigerated processes/Storage (Swan offered Keith's talk to TC10.5)

Basics: Applications Chapter Review ()

Topics from outside? How to poll this? (M-K)
Send to whom? Ask wider ASHRAE?
Sales reps, students/universities, MEP engineering firms, TCs
Ask for suggestions on other topics.
Link to past programs available online as a member for \$120 [link]?

PAST PROGRAMS

2021 “Chicago”/“Phoenix”

Elevator Noise, Vibration, Energy Efficiency
(Boldt/Miller-Klein)
Noise/Vibration Commissioning/Remediation
(Bauch/Miller-Klein)
Sound/Vibration Issues w/Mission Critical Facilities
(Bauch/LaForgia/Miller-Klein)

2020 Orlando/“Austin”

Vibration Isolation Advances
(Golden/Scarlett/Meeuwssen)
Beware These Common Concerns in Multi-Family
Buildings (Miller-Klein, Dong/Rawlins/Golden)
When Is “Quiet” Quiet Enough (Marks/Kollevoll)
HT: ANSI S12:60 / FGI vs 189.1 (Miller-Klein)
HT: Speech Privacy (Koukounian)
HT: Pandemic effects on acoustics

2019 Atlanta/Kansas City

RP-1408 Ductwork research (Herrin/Schwob)
VRF Systems (Lilly/Miller-Klein/Wowk)
Noise/Vib Equipment Selection
(Boldt/Eichelberger/Wowk)
HT: IBC updates (Schmeida)
HT: Basecamp (Miller-Klein)
Commissioning (Miller-Klein/Swan)
Chilled Beams (Searle/Peterman/M-K)
Blocked Impedance (Meeuwssen)

2018 Chicago/Houston

Impacts of Safeguarding Buildings/HVAC Systems
(Miller-Klein)
HT: User Manual 189.1 Acoustic Ctrl, Next Steps
HT: LNG Facilities (Keith)

2017 Las Vegas/Long Beach

Acoustic Performance Standards for Residential
Buildings (Miller-Klein)
HT: Mech Equipment Vibration & Structural
Interaction (Wowk)

2016 Orlando/St Louis

TP: Simulating Noise Attenuation in Ducts (Kuehn)
Acoustics in Multi-Family Residential Environments
(Papadimos)
Avoiding Pitfalls Integrating Seismic and Sound
Control (w/2.07)
HT: Algorithms for HVAC Acoustics

2015 Chicago/Atlanta

System Effects from Inlet of Centrifugal/Plenum
Fans (w/5.1,5.9)
Acoustic Mitigation for Lightweight Roof
Assemblies (Miller-Klein)
Green Building Acoustics (Miller-Klein)
HT: Condensing Units on Lightweight Roof (Lilly)
HT: Sound measurement in rooms (Lilly)

2014 New York/Seattle

Equipment: Hydronic Systems (Miller-Klein)
Basics: Environmental Noise Impact & Mitigation
(Wang)

2013 Dallas/Denver

Basics of HVAC Noise Control (Miller-Klein)
Numerical Methods for Noise/Vibration Simulation
(Eichelberger)
HT: ASHRAE 189.1

2012 Chicago/San Antonio

Vibration Induced Noise & Mech Equipment
Isolation (Marks)
HT: BIM and Acoustics
Impacts of Poor Aerodynamic HVAC Conditions
(Schaffer)
New Acoustical Criteria and Measuring Methods
(Peterman)
Review of Updated AHRI Standards (Papadimos)

2011 Las Vegas/Montreal

Recent Research: Healthcare Facility Acoustics
(Papadimos)
Acoustic Codes/Standards/Guidelines
(Muehleisen)
HT: Classroom Physical Environment Effects on
Learning (Reynolds)
Fan Array Efficiency/Performance (Raychaudhuri)
Forum: Incorporating Acoustics into BIM
(Peterman/Mitchell)

2010 Orlando/Albuquerque

Acoustics in High Performance Building (Peterman)
Noise & Mech System Design Process (Lilkendey)
Multiple Plenum Fans in an Array (Ganesh)
HT: Criteria (Paige) / Lined Duct End Reflection
(Lilly)
HT: Int'l GBC (Marks) / Terminal Unit
Tests/ASHRAE 130 (Peterman)
Classroom HVAC Noise Control (Lilkendey)
Unique Case Studies (Papadimos)
TP: Effects of Mech System Noise on Human
Perf./Perception (Roy)
Sustainability and Our Environment (Ronsse)

2009 Chicago/Louisville

Staff Performance/Patient Welfare in Healthcare
Facilities (Wang)

2008 New York/Salt Lake City

TP: End Reflection (RP-1314) (Eichelberger)
TP: Fan System Effects (RP-1219) (Eichelberger)

2007 Dallas/Long Beach

Acoustics for Green Buildings (Roy)
Acoustic vs Seismic (Lama/Marks/Blazier)
Lab Noise Control (Johnson/Moiseev)

ASHRAE TECHNICAL COMMITTEES

1.0-FUNDAMENTALS AND GENERAL

- 1.1 Thermodynamics and Psychrometrics
- 1.2 Instruments and Measurements
- 1.3 Heat Transfer and Fluid Flow
- 1.4 Control Theory and Application
- 1.5 Computer Applications
- 1.6 Terminology
- 1.7 Business, Management & General Legal Education
- 1.8 Mechanical Systems Insulation
- 1.9 Electrical Systems
- 1.10 Electric Motors and Motor Control
- 1.11 Moisture Management in Buildings
- 1.13 Optimization

2.0-ENVIRONMENTAL QUALITY

- 2.1 Physiology and Human Environment
- 2.2 Plant and Animal Environment
- 2.3 Gaseous Air Contaminants and Gas Contaminant Removal Equipment
- 2.4 Particulate Air Contaminants and Particulate Contaminant Removal Equipment
- 2.5 Global Climate Change
- 2.6 Sound and Vibration
- 2.7 Seismic, Wind and Flood Resistant Design
- 2.8 Building Environmental Impacts and Sustainability
- 2.9 Ultraviolet Air and Surface Treatment
- 2.10 Resilience and Security
- TG2 HVAC Security

3.0-MATERIALS AND PROCESSES

- 3.1 Refrigerants and Secondary Coolants
- 3.2 Refrigerant System Chemistry
- 3.3 Refrigerant Contaminant Control
- 3.4 Lubrication
- 3.6 Water Treatment
- 3.8 Refrigerant Containment

4.0-LOAD CALCULATION, ENERGY REQUIREMENTS

- 4.1 Load Calculation Data and Procedures
- 4.2 Climatic Information
- 4.3 Ventilation Requirements and Infiltration

- 4.4 Building Materials and Building Envelope Performance
- 4.5 Fenestration
- 4.7 Energy Calculations
- 4.10 Indoor Environmental Modeling
- TRG4 Indoor Air Quality Procedure Development

5.0-VENTILATION AND AIR DISTRIBUTION

- 5.1 Fans
- 5.2 Duct Design
- 5.3 Room Air Distribution
- 5.4 Industrial Process Air Cleaning (Air Pollution Ctrl)
- 5.5 Air-to-Air Energy Recovery
- 5.6 Control of Fire and Smoke
- 5.7 Evaporative Cooling
- 5.9 Enclosed Vehicular Facilities
- 5.10 Kitchen Ventilation
- 5.11 Humidifying Equipment

6.0-HEATING EQUIPMENT, HEATING AND COOLING SYSTEMS AND APPLICATIONS

- 6.1 Hydronic and Steam Equipment and Systems
- 6.2 District Energy
- 6.3 Central Forced Air Heating and Cooling Systems
- 6.5 Radiant Heating and Cooling
- 6.6 Service Water Heating Systems
- 6.7 Solar and Other Renewable Energies
- 6.8 Geothermal Heat Pump and Energy Recovery Applications
- 6.9 Thermal Storage
- 6.10 Fuels and Combustion

7.0-BUILDING PERFORMANCE

- 7.1 Integrated Building Design
- 7.2 HVAC&R Construction & Design Build Technologies
- 7.3 Operation and Maintenance Management
- 7.4 Exergy Analysis for Sustainable Buildings (EXER)
- 7.5 Smart Building Systems
- 7.6 Building Energy Performance
- 7.7 Testing and Balancing
- 7.8 Owning and Operating Costs
- 7.9 Building Commissioning

8.0-AIR-CONDITIONING AND REFRIGERATION SYSTEM COMPONENTS

- 8.1 Positive Displacement Compressors
- 8.2 Centrifugal Machines
- 8.3 Absorption and Heat Operated Machines
- 8.4 Air-to-Refrigerant Heat Transfer Equipment
- 8.5 Liquid-to-Refrigerant Heat Exchangers
- 8.6 Cooling Towers and Evaporative Condensers
- 8.7 Variable Refrigerant Flow (VRF)
- 8.8 Refrigerant System Controls and Accessories
- 8.9 Residential Refrigerators and Food Freezers
- 8.10 Mechanical Dehumidification Equipment and Heat Pipes
- 8.11 Unitary and Room Air Conditioners & Heat Pumps
- 8.12 Desiccant Dehumidification Equipment and Components

9.0-BUILDING APPLICATIONS

- 9.1 Large Building Air-Conditioning Systems
- 9.2 Industrial Air Conditioning and Ventilation
- 9.3 Transportation Air Conditioning
- 9.4 Justice Facilities
- 9.6 Healthcare Facilities
- 9.7 Educational Facilities
- 9.8 Large Building Air-Conditioning Applications
- 9.9 Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment
- 9.10 Laboratory Systems
- 9.11 Clean Spaces
- 9.12 Tall Buildings

10.0-REFRIGERATION SYSTEMS

- 10.1 Custom Engineered Refrigeration Systems
- 10.2 Automatic Icemaking Plants and Skating Rinks
- 10.3 Refrigerant Piping, Controls and Accessories
- 10.5 Refrigerated Processing and Storage
- 10.6 Transport Refrigeration
- 10.7 Commercial Food and Beverage Refrigeration Equipment
- 10.8 Refrigeration Load Calculations

Email Programs' chair: TCXXxx.PRO@ashrae.net

Activities and Timeframe:

	<u>2021</u>		<u>2022</u>				<u>2023</u>			
	Phoenix	4Q	LasVegas	2Q	Toronto	4Q	Atlanta	2Q	Tampa	4Q
<u>Joint Booklet</u>										
phase 1 - format										
phase 2 - initial drafts										
phase 3 - refined drafts										
phase 4 - ASHRAE guidance										
phase 5 - final edits										
<u>Ch 49 - Applications</u>										
General Discussions										
Edit markups										
Submittal										
Galley Proofs										
<u>New Vibration Isolation Concept</u>										
Format Draft										
Needed Research RPs										
<u>Ch 8 - Fundamentals</u>										
General Discussions										
Edit markups										
Submittal										