

ASHRAE TC 2.6 Sound and Vibration Control

Main Committee Meeting Minutes

2:30 PM – 4:30 PM EDT Monday June 26, 2023

Annual Conference – Tampa

NOTE: All Task Group Chairs and Subcommittee Chairs are asked to submit written report to the Secretary (Brandon Cudequest) before Friday June 30th, 2023

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: "In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and we shall avoid all real or perceived conflicts of interests.
(<https://www.ashrae.org/about/governance/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. 10 members – 9 members present
 - 3.1.1. Paul Bauch – In-person
 - 3.1.2. Brandon Cudequest – Virtual
 - 3.1.3. Michael Dick – Virtual
 - 3.1.4. Matthew Golden – Virtual
 - 3.1.5. Kathryn Hatlestad – Virtual
 - 3.1.6. Robert Hassler – Virtual
 - 3.1.7. Dan LaForgia – Virtual
 - 3.1.8. Benjamin Shafer – Absent
 - 3.1.9. Jeremy Stockmans – In-person
 - 3.1.10. Karina Saenz-Acosta – In-person

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

- 4.1. Kathryn motioned to approve the minutes
- 4.2. Paul seconded it
- 4.3. 9-0-0

5. Secretary's report (Cudequest)

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://tpc.ashrae.org/Membership?cmtKey=5a477d0e-214d-4fd0-9e9e-edf8e24a623b>
- 6.2. New members were asked to join at the ASHRAE TC 2.6 website.

7. ASHRAE Liaison

- 7.1. Section Head – Jon Cohen/Patrick Marks
- 7.2. Research – William Hutzler, Chris Gray
- 7.3. Standard – Gerald Kettler
- 7.4. Staff – Steven Hammerling
- 7.5. Handbook
 - 7.5.1. Fundamentals: Caroline Calloway
 - 7.5.2. Applications: Joe Sanders

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

- 8.1. 2023-2024 Chair, Paul Bauch
- 8.2. 2023-2024 Vice Chair, Brandon Cudequest
- 8.3. 2023-2024 Secretary, Kathryn Hatlestad

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

9.1. Research Subcommittee (Meeuwsen)

- 9.1.1. Research Chair's meeting report – Report can be found towards the end of this document
- 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. PTAR 001 – Update of ASHRAE Publication: Application of Manufacturers' Sound Data
 - 9.1.2.5. RTAR 1882 – Procedure for Estimating Occupied Space Sound Levels in the Application of UFAD Air Terminals and Air Outlets
 - 9.1.2.5.1. Jeremy motioned to approve the WS
 - 9.1.2.5.2. Brandon seconded it
 - 9.1.2.5.3. 9-0-0
- 9.1.3. Topics for future research

9.2. Programs Subcommittee (Swan)

- 9.2.1. Program Chair's meeting report – Report can be found towards the end of this document
- 9.2.2. Programs this meeting
 - 9.2.2.1. Heat Pumps Space Heating/ Heat Pumps & Natural Gas Combos/Sound Attenuation (Poster)
Location: JW Marriott Tampa Water Street, Tampa Bay 8
Sunday, June 25th, 11:00 AM - 12:30 PM EDT
11:09AM - Calculating Breakout from HVAC Ductwork (Presented by Jerry Lilly)
11:15AM - Simulation of Duct Breakout Transmission Loss and Applications (Presented by David Herrin)
 - 9.2.2.2. Seminar 20: LIVESTREAM: Acoustic Impacts of Designing for High Performance and Decarbonization
Location: JW Marriott Tampa Water Street, Tampa Bay 1
Chair: Patrick Marks. Speakers: Curtis Eichelberger, Jerry Lilly and Erik Miller-Klein
Sunday, June 25th, 3:15 PM - 4:45 PM EDT
- 9.2.3. Programs at Chicago 2024

9.3. Publications Subcommittee (Wise)

- 9.3.1. Publications Chair's meeting report – Report can be found towards the end of this document
- 9.3.2. Handbook chapters
- 9.3.3. Other publications

9.4. Web page (Saenz-Acosta)

- 9.4.1. Tone software from RP 1707 can be found in TC 2.6 website under Documents/Other Publications. The software doesn't identify annoyance for tones above 1000Hz

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/Shafer)

- 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: Dan LaForgia, Benjamin Shafer, Karina Saenz Acosta
 - 9.7.3.2. Rolling on: Edgar Duroni, Viken Koukounian, Karl Peterman
- 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 Fans (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 Facilities (Koukounian)
 - 9.7.4.7. ASHRAE TC 9.7 Educational Facilities
 - 9.7.4.8. ASHRAE TC 9.8 Specialized Building HVAC Applications
 - 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 – Chicago, IL January 20 – 24, 2024

12. Adjournment

Research project status:

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.
- Work is progressing very well, some of the analysis was more involved than expected. Will likely ask for a no-cost extension through the end of the year.
- PMS chair is Erik Miller-Klein, will hold a meeting on July 13 in the normal monthly TC slot.

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

- The revised work statement was released for bid this Spring. Bids have been received.
- Brandon Cudequest is lead author of WS and chair of PES.
- PES has completed scoring and made a selection, needs approval from exec committee.

PTAR-001 - Update of ASHRAE Publication: Application of Manufacturers' Sound Data

- PTAR approved by RAC, work statement under development. Goal now is to complete it by then end of the year.
- Steve Wise lead author

WS-1882 - Procedure for Estimating Occupied Space Sound Levels in the Application of UFAD Air Terminals and Air Outlets

- The "final" draft of the work statement was circulated to voting members yesterday.
- TC 2.6 will be lead, TC 5.3 will be co-sponsor. Nick Searle from Titus is lead author of the WS, help from Burroughs and Meeuwsen.
- A vote of TC was taken at the Main meeting today. Approval passed on a vote of 9-0-0-1.

Notes from Research Chairs Breakfast

- Our new RL is Chris Gray
- The maximum funding for research project has been increased from \$250K to \$350K
- No RTAR's were submitted this cycle. RAC reviewed 9 work statements, 4 approved with comment, 5 returned for revision.
- Remember that all new PMS members must go through training from ASHRAE.

ASHRAE TC 2.6 Sound and Vibration

PROGRAMS SUBCOMMITTEE MINUTES – 2023 Annual Meeting, Tampa, Florida – Sunday 25 June 2023

1. Gave overview types of programs
2. Two TC 2.6 programs this meeting: conference papers on duct break out and Seminar 20 on high performance buildings
3. Reviewed Survey Monkey poll: overarching takeaway was that the educational topics more desired.
4. Next meeting Chicago (January 2024): Submit two sessions, abstracts due 2 August 2023:
 - a. Lab v Prediction v Field (Bauch)
 - b. rework Tunnel Ventilation as Equipment Series: Silencers (LaForgia).
5. Upcoming meetings: Indianapolis (June 2024), Orlando (January 2025), Phoenix (June 2025)
 - a. Equipment Series: Rooftop Systems (Peterman)
 - b. Noise calculations/acoustics metrics (Miller-Klein)
 - c. Latest research (Miller-Klein)
 - d. Updated vibration isolation table (Wise/Miller-Klein)

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

[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:
Tampa, 24-28 June 2023**

Tracks:

- 1: HVAC&R Systems and Equipment
- 2: Fundamentals and Applications
- 3: Research Summit
- 4: Pathways to Net Zero Energy/Decarbonization
- 5: Future-Proofing the Built Environment
- 6: Building Automation/Control Systems (BACS)
- 7: Professional Development/Education

Seminars/Paper Sessions:

Poster session: Duct Breakout

Sunday 25 June 2023, Water Street, Tampa Bay 8
11 AM – 12:30 PM
11:09 AM – Jerry Lilly
11:15 AM – David Herrin

Seminar 30: *Acoustic Impacts* of designing for High Performance Buildings

Sunday 25 June 2023, 3:15 PM – 4:45 PM in Tampa Bay 1 and livestream:

1. Pat Marks chair
2. Curt Eichelberger, Jerry Lilly, Erik Miller-Klein speakers

Hot Topics:

[None this time]

**NEXT MEETING:
Chicago, 20-24 January 2024**

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Refrigeration & Refrigerants
- 4: Decarbonization and Climate Change
- 5: Hydronic Systems
- 6: Ventilation, IAQ and Air Distribution Systems
- 7: Comfort, IEQ and Energy Efficiency
- 8: HVAC&R Controls
- 9: Project Delivery Methods

Seminars/Workshops/Forums:

Proposals due: 2 August 2023 (↑↓ Nov 23)

Track 1: **Prediction v Lab v Field** (Bauch) Marks, Miller-Klein, Eichelberger, Wowk

Track 6: Equipment series on **Silencers** (or exhaust fans) (LaForgia), include tunnel/underground ventilation w/5.1 (rework/submit), add third/fourth speakers

Hot topics:

[To be discussed at monthly meetings]

**FOLLOWING MEETINGS:
Indianapolis, 22-26 June 2024**

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Research Summit
- 4: Professional Development
- 5: Electrification: Possibilities and Pitfalls
- 6: Artificial Intelligence and the Built Environment
- 7: Building Life Cycle Assessment
- 8: Legislation, Standards, Codes, and Guidelines

Seminars/Workshops/Forums:

Proposals due: late February 24 (↑↓ mid-April 24)

Track 2: **Rooftop Systems** (Peterman)

Equipment:
Standards/Testing:
Consultant/Lessons:

Track 1: Acoustics metrics/**noise calculations** and when to use them (Erik M-K)

Track 3: The latest in HVAC noise and vibration research (Erik M-K)

Conference Papers:

Nov 2023: Abstracts due (↑↓ Dec 2023)
Mar 2024: Papers due (↑↓ Apr 2024)

Later meetings:

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

ASA/ASHRAE joint session, New Orleans, May 2025 (Kay Hatlestad)

Future:

Orlando 8-12 Feb 25 / **Phoenix** 21-25 Jun 25

Las Vegas 31 Jan-4 Feb 26 / **[?]** June 26

Suggest conference track to ASHRAE?

Programs topics survey results: January/February 2023

The topics are grouped into categories: Equipment, Basics and General:

- Our **Equipment Series** seminars have three speakers cover 1) What the item of machinery is, how it works and how it makes noise, usually presented by a manufacturer; 2) What standards and specifications apply to the item, how its lab data are presented, and typical noise/vibration mitigation methods; and 3) Case studies showing field issues, testing challenges and general pitfalls.
- Our **Basics Series** of seminars are designed to present several aspects of an acoustics concept.
- And then there are other **general topics** that are good to cover from time to time.

Series: Equipment

27 Silencers/attenuators
21 Rooftop systems
16 Air distribution systems
15 Fan boxes: above ceilings/below floor
9 DOAS (Dedicated Outdoor Air Systems)
9 Generators
7 Pumps
6 Fume hoods
6 VRF/electrical systems
6 WSHP (Water Source Heat Pumps)
5 Under-Floor Air Systems
4 Compressors
4 Plumbing noise
4 Small fan coils
3 PTAC (Packaged Terminal Air Conditioners)
3 Industrial ventilation: dust collection
2 Industrial ventilation: Tunnels/subways
1 Electrical: transformers, electric motors
1 Industrial ventilation: garages
1 Refrigeration: commercial/transport
0 Boilers
0 Tankless water heaters

Other suggestions:

Chillers
Plenum calculations

Series: Basics

28 Prediction vs Lab vs Field
18 Noise calculations: How To
14 Speech Privacy in Low Noise Offices
12 Noise Flanking Paths
12 How Noise Affects the Design Process
11 Incorporating Tones Into Noise Criteria
10 Effects of 'Over-Design'
6 Room Measurement Test Method
6 Commissioning
4 Noise and Productivity
1 Applications Chapter Review

Other suggestions:

Vibration: Table 47
Sustainability: IEQ optimize, decarbonization

General Topics:

15 Passive vs Active attenuation
12 Classrooms
9 Healthcare design: Alarm fatigue, FGI, privacy
8 Standard test for seismic devices
8 Noisy machinery very near receivers
6 Shell & Core vs Tenant Fit-Out/Improvement
4 Noise Fluctuations
4 Performance Rated Buildings
4 Labs internal: Air Valves/Fume Hoods
4 Labs external: Stacks, Ventilation, Nozzles
3 Mission Critical Facilities
1 Industrial Noise: LNG (Liquid Natural Gas)

Other suggestions:

Acoustic metrics primer (when to use each)
Specifying using sound power
Case studies/lessons learned
Cross laminated timber.

PAST PROGRAMS (Available online [\[link\]](#). Also at the TC 2.6 website.)

2023 Atlanta/Tampa

Acoustic issues in High Performance Building Design
(Lilly/Eichelberger/Miller-Klein)
Duct Breakout calculation advances (Lilly)

2022 Las Vegas/Toronto

Select/Size HVAC Fans for Optimum Acoustical
Performance (Lilly/Bausch/Ganesh)

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 Iso. 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 Equip. 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 & 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: TCXxx.PRO@ashrae.net

TC2.6 Publications Subcommittee Minutes – Tampa Hybrid, June 2023

Attendees:

Karina Saenz Acosta
Paul Bauch
Greg Meeuwssen
Kim Osborn
Edgar Duroni
John Iacobellis
Joel Walters
Eric Sturm
Erik Miller-Klein

Jerry Lilly
Jason Swan
Joel Walters
Steve Wortmann
Jeremy Stockmans
Patrick Marks
Nick Searle
Karl Peterman
Angela Waters

Raine Stewart
Sarpur Arun
Rewan Toubar
Don Warrick Jr.
Robert Hassler
Roderick Mackenzie
Ronald Eligator
William Hutzel
King Yeong Jin

Applications Handbook Ch 49 - rev2023

With many thanks to Jerry Lilly and Karl Peterman for last-minute edits to Galley Proofs received just 3 weeks before publication, we managed to confirm that all of our suggestions were implemented. We trust you all will find it in good order.
(Apparently the on-line release is delayed but some have received the print version)

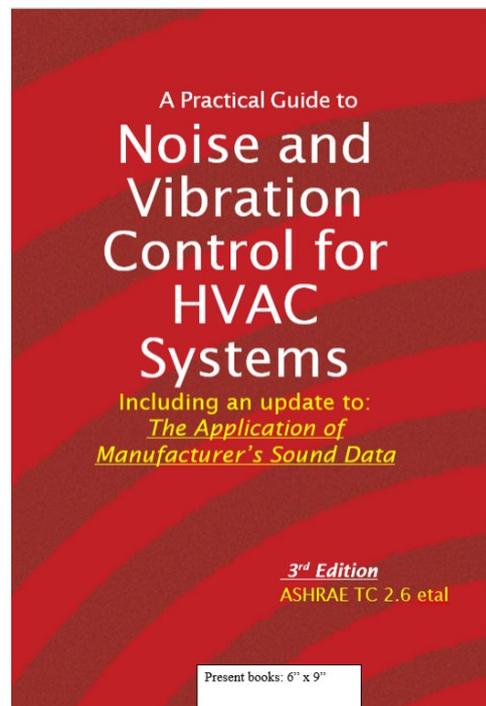
HEADS-UP to Erik M-K: The major changes strived for on Table 47 must be finalized and submitted by about March 2026. (For 2027 Rev)

Fundamentals Handbook Ch 8 (9?) – rev2025

Eric Sturm is doing a great job orchestrating revisions to this chapter. Amazingly, even though fundamental physics has not changed.....there have been a number of issues discovered so far.
(March 2024 submittal)

Joint Booklet Task Force:

Next Meeting Thursday July 13 11am EDT



	<u>Tentative New Chapter</u>	<u>Champion</u>	<u>Draft Received</u>
1	Fundamentals of Sound (18 pages)		
	PG AppA Some Basics of HVAC Acoustics	Steve Wise	9/8/2022 90%
	PG AppB Acoustical Rating Systems and Criteria		
	AMD Ch2 Sound Power Level and Sound Pressure Level		
	AMD Ch3 Noise Ratings and Acceptability Criteria		
2	Specifications (19 pages)		
	PG Ch6 Specifications	Brandon Cudequest	9/8/2022 90%
	PG AppD Using Manufacturers' Sound Data		
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	incl: architectural layout, wall STC etc.	Steve Wise	12/31/2022 50%
	PG xix Introduction		
	PG Ch1 General Design Guidelines		
4	Airside Equipment		
	PG Ch2 Airside Equipment		
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	AMD Ch9 Panel-Type Propeller Exhaust Fans		
	AMD Ch8 Roof Ventilators		
	4.2 AHUs & FCUs (4 pages)	Paul Bauch	5/10/2022 75%
	??? Include Fan Arrays (Panel Construction?)		
	AMD Ch5 Central-Station Air-Handling Units		
	4.3 Terminal Devices	Randy Zimmerman	
	Valves, GRDs, Chilled Beams		
	AMD Ch10 Grilles, Registers, and Diffusers		
	AMD Ch11 Air Terminals		
	4.4 Exhaust Fans, fume hoods, etc.	??	
	4.5 ceiling fans, bathroom exhaust, kitchen exhaust	??	
5	Waterside Equipment		
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	5.2 Piping (6 pages)	Steve Wortman	1/11/2023 90%
	5.3 Air-cooled Chillers & Condensing Units	JCI Team Redux	
	AMD Ch14 Air-Cooled Chillers and Condensing Units		
	5.4 Water-cooled Chillers		
	AMD Ch15 Water-Cooled Chillers		
	5.4 Heat Rejection Equipment (incl. Cooling Towers)	Erik Miller-Klein	
	AMD Ch16 Cooling Towers		
	5.5 Boilers	Steve Wortman	

	<u>Tentative New Chapter</u>	<u>Champion</u>	<u>Draft Received</u>
6	Packaged, Unitary and Residential Equipment	Greg	8/29/2022 50%
	PG Ch4 Packaged and Unitary Equipment	first 11 pages	
	AMD Ch12 Room Fan Coil Units		
	AMD Ch6 Commercial Packaged HVAC Equipment		
	6.1 Packaged Rooftop Units	Eric Sturm	
	6.1 Wall mounted (un-ducted, PTAC)		
	6.3 Split Systems		
	6.4 Water-source Heat Pumps VPAC		
	6.5 VRF (New)		
	6.6 High efficiency water heaters?		
	6.7 Condensers		
	Heat pump and induction fan noise ?		
7	Auxiliary Equipment (New)	Steve Wortmann	
	7.1 Transformers		
	7.2 Generators		
8	Noise and Vibration Control Products	Karl Peterman	
	PG Ch2 "Silencer" Extracts		
	PG Ch5 Vibration Isolation		
	AMD Ch7 Silencers for HVAC Systems		
	AMD "Vibration" Extracts from various equipment chapters		
	8.1 HVAC Silencers	Edgar Duroni	
	8.2 Acoustic Louvers/Dampers		
	8.3 Vibration Isolation		
	8.4 Duct Insulation		
	8.5 Enclosures/Barriers		
	Includes liner and lagging		
9	Construction / Startup / Trouble-Shooting	Jerry Lilly	
	PG Ch2 "Silencer" Extracts		
	PG Ch2 "Silencer" Extracts		
	PG Ch2 "Silencer" Extracts		
10	Lab Test Procedures	Jerry Lilly	
	AMD Ch17 Overview of HVAC Test Procedures		