

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.

180 Technology Parkway NW,
Peachtree Corners, GA 30092
404-636-8400

TC MINUTES COVER SHEET

TC/TG/TRG NO. _____ TC 5.2 _____ DATE June 25, 2024

TC/TG/TRG TITLE Duct Design

DATE OF MEETING June 25th, 2024 3:30 PM EST LOCATION Indianapolis, Indiana (Hybrid)
[Click Here for "Join by Video" Instructions TEAMS](#)

MEMBERS PRESENT	TERM TO	MEMBERS ABSENT	Y E A	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Cindy Bittel, Chair (Voting)	6/30/25			Dr. Jamie Fine, Duct Fitting Database Subcommittee Chair
Akshay Bhargava, Vice Chair (Voting)	6/30/25			John Constantinide, Handbook Subcommittee Chair
Christpher Ruch, Secretary/Webmaster (Voting)	6/30/25			Aakash Patel, Program Subcommittee Chair
Ralph Koerber, Code Interaction (Voting)	6/30/25			Kevin Gebke, Research
Dr. Stephen Idem, Endowment Subcommittee Chair (Voting)	6/30/25			Randy Young, Membership
Vikram Murthy* (Voting)	6/30/25			

* Member Non-Quorum

CM = Corresponding Member

PCM = Provisional Corresponding Member

G = Guest

DISTRIBUTION

All Members of TC plus the following:	
TAC Section Head	Kevin Marple
TAC Chair	Craig Messmer
2021 Handbook Liaison (Fundamentals)	Satesh Iyengar
2020 Handbook Liaison (Systems & Equipment)	
Research Liaison	Douglas C Scott
Standards Liaison	William F Walter
Staff Liaison	Steven J Hammerling

**ASHRAE 2024 Annual Conference
ASHRAE TC 5.2 Duct Design
FULL COMMITTEE MEETING**

AGENDA

**Tuesday, June 25, 2024
Time: 3:30 PM – 5:30 PM EST
Location: Indy Marriott, Indiana (G)
Indianapolis, Indiana, USA
and
Virtual Meeting**

Virtual meeting access information is available at the TC 5.2 website, located at <https://tc0502.ashraetcs.org/>.

1) Call to Order

2) ASHRAE Code of Ethics Commitment – Cindy Bittel

“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.”

- a) ASHRAE Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>
- b) ASHRAE Core Values: <https://www.ashrae.org/about/ashrae-s-core-values>

3) Introductions and Attendance

- a) Recognize attendees
- b) Quorum reached? out of 6 voting members attending (Requires _ present)
- c) Corrections/additions and approve agenda

4) 2024 January Meeting Minutes

- a) The DRAFT minutes have been posted to on the [TC 5.2 Webpage](#) and [Basecamp](#) in the Files > Minutes folder for Voting Members to review.
- b) Approval of Minutes

5) Reminders – Cindy Bittel

- a) ASHRAE Mission: To serve humanity by advancing the arts and science of heating, ventilation, air conditioning, refrigeration and their allied fields.
- b) ASHRAE Vision: A healthy and sustainable built environmental for all.
- c) **ASHRAE Artificial intelligence (AI) policy:** *ASHRAE prohibits the entry of content from any ASHRAE publication or related ASHRAE intellectual property (IP) into any AI tool, including but not limited to ChatGPT. Additionally, creating derivative works of ASHRAE IP using AI is also prohibited without express written permission from ASHRAE.*
- a) TC 5.2 Scope: TC 5.2 is concerned with the design, characteristics and construction of all types of ductwork for the handling of air and other gases, but does not include chimneys.
- b) Virtual Meeting Protocols

- c) TC 5.2 MBOs are reflected by our Strategic Plan and referenced on the agenda with asterisk symbols (**)

6) Section 5 Report – Kevin Marple

- a) Update
- b) TC Activity Form is due June 25th, 2024

7) Herman and Dorothy Behls Endowment – Dr. Stephen Idem

- a) Travel Scholarship - was awarded to Mostafa Saad for 2024 Winter Conference
- b) HVAC Designer Certification Award – no applications received
 - i) Recommendation – possibly award 2 travel scholarships in future and discontinue the Designer Certification award, if no applications are received

8) Subcommittee Reports

a) **Membership – Randy Young**

- i) Recognize new Provisional Corresponding Members (PCMs) since January 2023.
- ii) Introduce new Membership Chair – Jeremy Zeedyk
- iii) Outreach to create outreach plan to meet Strategic Plan goal to recruit at least two (2) TC members from the following industry segments**:
 - a) Duct Design Engineers
 - b) Academics and Researchers Focused on Duct Design
 - c) Code Authorities/Authorities Having Jurisdiction (*Additional recruitment needed*)
 - d) Building Owners/Managers and Owner Authorized Representatives
 - e) General Contractors, Mechanical/Sheet Metal (including SMACNA) (*Additional recruitment needed*)
 - f) Contractors, and Associated Technicians

b) **Handbook – John Constantinide**

- i) Fundamentals Handbook, Chapter 21, Duct Design is ready for vote, due to ASHRAE Handbook by June 30th, 2024.
 - a) Vote or push to e-ballot
- ii) File can be found on Basecamp under Docs&Files>Handbook>2025 Revisions

c) **Programs – Aakash Patel**

- i) Status Report
- ii) Aim for Strategic Plan goal of having at least one (1) ASHRAE Chapter seminar every six (6) months addressing a topic within the scope of TC 5.2.
 - a) Action Items Identified in Tampa 2023
 - i. **Action Item** – John Constantinide reached out to CTTC for having RVCs to chapter ctic chairs to schedule chapter presentation/meeting about DFDB – no response. Recommend linking DFDB to decarbonization, but there was concern (Craig Wray) about linking unless we have data to back up.
 - ii. **Action Item** – Jamie Fine can provide tutorial of DFDB and resulting energy consumption reductions. Separate programs

meeting to discuss. Vikram Murthy offered to assist and look at it from an IAQ perspective

- iii. **Action Item** – Aakash Patel (Program Chair) to run interim Programs meeting and work on a presentation to submit. Focus on whether it should be DFDB alone or linked to decarb/IAQ/Energy Efficiency

d) **Duct Design Guide (DDG)** – Larry Smith

- i) Create an education program utilizing content from the Duct Design Guide.** - Requested volunteers at last meeting to contact Larry directly
- ii) Create a plan to publicize the Duct Design Guide education program to ASHRAE and non-ASHRAE members.** - Requested volunteers at last meeting to contact Larry directly
- iii) Status of SI Version of DDG – stalled due to lack of volunteers
- iv) Duct Design Guide is being sold in the Bookstore

e) **Duct Fitting Database** (DFDB)** – Jamie Fine

- i) Subcommittee Report
- ii) Ongoing Maintenance and Updates
 - a) Action Item Identified in Tampa 2023
 - i. **Action Item** – **ONGOING** Bob and Kevin Gebke reviewed previous/historical CFD research study (RP1493, 1682) and provided summary on Basecamp. Dr. Fine will followup with TC 4.10 about CFD modelling. Dr. Idem, Steve Rogers, Kevin Gebke, Bob Reid and Dr. Fine will define scope for new project and develop and RTAR. Jamie Fine determined the task can be done from a technical perspective and plans to research and complete. Report also shared with Steve Rogers.
- iii) Create a user guide assisting practitioners with utilizing the Duct Fitting Database, with a timeline for publication of the user guide.**
 - a) Update

f) **Research – Kevin Gebke**

- i) Status of RTAR 1941 “Experimental Program to update the DFDB” – now WS 1941 status (Stephen Idem)
 - a) Unresolved to find a co-sponsoring TC, but RAC liaison implied that would not be a great impediment to funding due to SPIDA support.
 - b) Discussion/vote
- ii) Status of RTAR -1974 The Effect of Tap Shape on Air Device Performance for Exposed Duct-Mounted Diffusers (Kevin Gebke, Randy Young and Bob Reid)
- iii) Brandon Cudequest – RP-1919, The effects of duct size and aspect ratio on flow noise in elbows; Responsible Committee: TC 2.6 (Sound and Vibration); Co-Sponsors: TC 5.2 (Duct Design)
 - a) Update
- iv) Jeremy Zeedyk – RTAR for open plenums v return plenums. Kevin and Chris Ruch volunteered to help.

g) **Codes & Standards Interaction** - Ralph Koerber

- i) **See Addendum A**

- ii) **SSPC 90.1 Liaison** – Ian Cavanaugh
 - a) Anyone else interested in being a liaison
- h) **Webmaster** – Christopher Ruch
 - i) TC 5.2 Website: <https://TC0502.ashraetcs.org/>
 - ii) Talk to Chris about joining TC 5.2 Basecamp.
 - iii) Action item – update documents section of website, add approved meeting minutes to website
 - iv) Action item – Chris Ruch go through and clean out Basecamp in comparison to Membership Roster
- i) **Historian** - Bob Reid
 - i) Status on Herman Behls Library.
 - a) Hard Copy library available to be checked out by contacting Bob Reid.
 - b) Documents used to create Duct Fitting Database needed from McGill Airflow LLC – Bob to provide John Constantine a list of documents, which he will make a request for ASHRAE president to request copies of the documents.
 - c) Action Item - Bob Reid to put a copy of document titles on Basecamp
- j) **YEA** – Ian Cavanaugh
 - i) Update
- k) **Membership Engagement Committee** (Kevin Gebke and Larry Smith)
 - i) Addendum B

9) Deadlines

- a) ASHRAE is meeting next in **Orlando, FL, USA, Feb. 8-12, 2025**. Seminar and Forum proposals are due by Monday, August 2, 2024. Please visit the following site to submit your proposal: For more information, go to: www.ashrae.org/conferences/2025-winter-conference-orlando.
 - i) Here's the deadlines:
 1. Wednesday, May 29, 2024 | Conference Paper Abstracts and Paper Session Requests Due
 2. Monday, June 17, 2024 | Conference Paper Abstract Accept/Reject Notifications
 3. Wednesday, June 19, 2024 | Website Opens for Seminar, Workshop, Forum, Debate and Panel Proposals
 4. Friday, August 2, 2024 | Debate, Panel, Seminar, Forum, Workshop, and Debate Proposals Due
 5. Wednesday, September 4, 2024 | Conference Papers Due
 6. Friday, September 27, 2024 | Conference Paper Accept/Revise/Reject Notifications
 7. Friday, October 4, 2024 | Debate, Panel, Seminar, Forum, Workshop Scheduling Notifications
 8. Wednesday, October 9, 2024 | Revised Conference Papers Due
 9. Monday, October 28, 2024 | Conference Paper Final Accept/Reject Notifications
- b) Research deadlines

- i) The next submission date for RTARs, PTARs and WSs is August 15, 2024.
- ii) The standing RAC submission dates for new and revised RTARs and WSs are as follows each year (MMAD 15):
- iii) March 15 – RAC Spring meeting consideration in April
- iv) May 15 – RAC Annual meeting consideration in June
- v) August 15 – RAC Fall meeting consideration in Sept. or Oct.
- vi) December 15 – RAC Winter meeting consideration in January

10) Notification

a) Awards and Honors

- i) Distinguished Service Award – Akshay Bhargava
- ii) Distinguished Service Award – Vikram Murthy
- iii) Retirement – Randy Young

11) Action Items

TC 5.2 Duct Design Action Items			
Number	Description	Assigned to	Status
1	Programs - John Constantinide to reach out to CTTC for having RVCs to chapter ctic chairs to schedule chapter presentation/meeting about DFDB. Also, create a Tech hour for Duct Fitting Data base	John Constantinide	Assigned Tampa 2023 - ongoing
2	Programs - Aakash Patel (Program Chair) to work on DFDB program	Aakash Patel	Assigned Tampa 2023 – ongoing
3	Duct Fitting Database (DFDB) - Bob and Kevin Gebke to review previous/historical CFD research study (RP1493, 1682) and provide summary on Basecamp. Dr. Fine will followup with TC 4.10 about CFD modelling. Dr. Idem, Steve Rogers, Kevin Gebke, Bob Reid and Dr. Fine will define scope for new project and develop and RTAR.	Bob and Kevin Gebke	Assigned Tampa 2023 - ongoing

12) New Business

- a) Bob Reid - Duct fitting data donated to ASHRAE - process to receive donated research material without creating additional ASHRAE research projects

13) Adjournment

Information about upcoming ASHRAE Conference Meetings are available at <https://www.ashrae.org/conferences/ashrae-conferences>.

Addendum A

TC 5.2 C&S Agenda (6/25/24)

1. Underwriters Laboratories

- UL181 Standards
 - UL181, UL181A, & UL181B
 - After extensive discussion and review, the UL181B proposal for consistency for Temperature Aging test requirements across Part I, Part II, and Part III (212°F/60days) failed to gain the needed votes to pass. TC members felt that there was no technical justification provided to make the change after UL indicated the temperature for mastic and tape was intentionally different based on location and placement of each materials in relation to the inside duct surface. The proponent plans to do more research into why the temperature is different and bring forward further proposals at a later date.
- UL Canada Standard
 - S102.2
 - 8th edition of the Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies successfully passed ballot on 4/16 and was reaffirmed for continuance as a Canadian National Standard.
 - S100A Technical Committee held a meeting on 1/16 to discuss issues regarding the new cycle. S110 (Air Ducts) and S102 (Surface Burn) Standards were discussed.
 - There are no known issues to report at this stage of the process.

2. NFPA 90A & 90B Standards

- 2027 Edition
 - NFPA is now accepting proposals for 2027 edition.
 - Current cycle proposal closing date is June 4, 2024.
 - The Technical Committee will meet on Sep 25 & 26 to review any proposals with a First Draft Report posting date of March 25, 2025.
 - Public comments to First Draft accepted up to June 3, 2025.
 - Technical Committee meets to review comments with Second Draft Report posting date of March 3, 2026.
 - NITMAM closing date of March 31, 2026.
 - NITMAM posting date of May 12, 2026.

3. International Code Council

- 2024 Edition
 - IECC & IRC
 - Appeal process is complete and finalized thus indicating the completion of the 2024 IECC development process. Publication should follow shortly.
- 2027 Edition Timeline

- Group A (IBC-E, IBC-FS, IFC, IFGC, IMC, IPC, IPSDC, IRC-M, IRC-P, ISPSC, IWUIC)
 - Open for proposals - 10/16/23 to 1/8/24
 - Posting of proposed changes - 2/26/24
 - Committee Action Hearing #1 - 4/7 to 4/16/24
 - Posting of CAH #1 results - 5/16/24
 - Open for comments to CAH #1 action - 5/16/24 to 7/8/24
 - Posting of comments to CAH #1 - 9/5/24
 - Committee Action Hearing #2 - 10/23 to 10/31/24
 - Posting of CAH #2 results - 12/2/24
 - Open for comments to CAH #2 action - 1/20/25 to 3/14/25
 - Posting of public comments to CAH #2 - 3/5/26
 - Public comment hearings - 4/19 to 4/28/26
- Group B (Admin, IBC-G, IBC-S, IEBC, IgCC (Ch. 1 & App M), IPMC, IRC-B, IZC)
 - Open for proposals - 10/15/24 to 1/10/25
 - Posting of proposed changes - 3/13/25
 - Committee Action Hearing #1 - 4/27 to 5/6/25
 - Posting of CAH #1 - 6/3/25
 - Open for comments to CAH #1 - 6/3/25 to 7/8/25
 - Posting of comments to CAH #1 - 9/10/25
 - Committee Action Hearing #2 - 10/22 to 10/30/25
 - Posting of CAH #2 - 11/25/25
 - Open for comments to CAH #2 - 11/25/25 to 1/5/26
 - Post public comments - 3/5/26
 - Public comment hearings - 4/19 to 4/28/26
- IMC & IRC-M Proposals and **Committee Action Hearings Results**
 - M47-24 Part I
 - [603.9.1] - Adds UL181C approved fittings for flex collars
 - **Approved with modification** (exception for collars that are a component of a listed appliance).
 - M47-24 Part I
 - [M1601.1.1] - Same as above to residential code
 - **Approved with modification** (typographical changes)
 - M48-24
 - [603.17] - Allows Air Dispersion systems for negative pressure
 - **Disapproved**
 - M50-24
 - [608.1] - Balancing of systems per SMACNA Standard
 - **Disapproved**
 - RM7-24
 - [M1601.1.1] - Building framing not allowed for ducts or plenums
 - **Disapproved**
 - RM8-24

- [M1601.1.1] - Allow plastic ducts with no approval (non-UL) for residential air ventilation systems.
- **Disapproved**
- RM9-24
 - [M1601.1.1] - Require zoning designs per ACCA Manual Zr.
 - **Approved with modification** (added “serving heating or cooling equipment”)

4. IAPMO - UMC Revision Cycle

- 2027 Cycle is ongoing
 - Call for proposals - closed on 1/12
 - Chapter 6 Working Group reviewed proposals from staff and developed 21 proposals to present to the TC along with public proposals received. These proposals were designed to clean up issues without making substantive changes to the UMC. RAK participated on behalf of ADC.
 - Proposals were sent to the TC for review on 4/1.
 - UMC TC meeting to act on proposals was held on 5/9 & 5/10. RAK attended as a voting member. WR attended as observer.
- Proposals of concern that need watching (*TC Action to date*) -
- Item #107 [602.1, 602.2] - attempts to remove concealed spaces as ducts under the guise of combustibles.
 - **Rejected**
 - Item #119 [602.5.5, 602.5.6, 603.1.2, Table 1801.1] - this could eventually allow PVC ducts in attics, crawl spaces, etc. - also question the specifications.
 - **Rejected**
 - Item #121 [602.6, Table 1801.1] - allows 450 smoke index value - need to review the scope of NFPA 286.
 - **Rejected**
 - Item #127 [603.4] - requires rigid straps - ADC says “of sufficient width & rigidity”.
 - **Rejected**
 - Item #133 [203.0, 603.12] - negative pressure for air dispersion devices - needs modified for limitations.
 - **Rejected**
 - Item #135 [605.1.1, Table 1801.1] - excludes PU foam from 25/50 and allows 450 smoke index.
 - **Rejected**
 - Item #136 [605.1.2] - allows 450 smoke index for PU foam.
 - **Rejected**
- TC’s final votes on meeting actions are due by 6/28.
- Report on proposals (ROP) will be published on 8/9.

5. State Building Codes

- Georgia -

- . 2024 International Residential Code (IRC) Task Force has held regular meetings in 2024 to review proposed GA amendments to the IRC for adoption. Latest meeting was held on 4/17.

Item of interest (*Task Force action to date*) -

- IRC-2024-42 [M1601.1.1] - strikes currently allowed use of gypsum products to construct return ducts or plenums unless lined with metal, flex, duct board, or other approved materials.
- ***Make modifications and carry forward to next meeting.***

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

~~5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.~~

7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

7.1 These cavities or spaces shall not be used as a plenum for supply or return air unless all such supply and return ducts are lined with metal, flex duct, duct board or other material that is approved in this section.

Next meeting of Georgia IRC Task Force to be held on 5/14.

- i. 2024 International Energy Conservation Code (IECC) Task Force has also held regular meetings in 2024 to review proposed GA amendments to the IECC for adoption. Latest meeting was held on 4/18.

Items of interest (*Task Force action to date*) -

- IECC-2024-1 [R403.3.7] - add new section for duct systems located in conditioned space.
- ***Disapproved***

R403.3.7 Duct Systems Located in Conditioned Space (Optional)

For duct systems to be considered inside a conditioned space, the space conditioning equipment shall be located completely on the conditioned side of the building thermal envelope. The ductwork shall comply with the following as applicable:

1. The ductwork shall be located completely on the conditioned side of the building thermal envelope.
2. Ductwork in ventilated attic spaces or unvented attics with vapor diffusion ports shall be buried within ceiling insulation in accordance with R403.3.8 and shall comply with the following:
 - 2.1. The air handler is located completely within the continuous air barrier and within the building thermal envelope.
 - 2.2. The ductwork leakage, as measured either by a rough-in test of the supply and return ductwork or a post-construction duct system leakage test to outside the building thermal envelope in accordance with Section R403.3.3, 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of conditioned floor area served by the duct system.

The ceiling insulation R-value installed against and above the insulated ductwork is greater than or equal to the proposed ceiling insulation R-value, less the R-value of the insulation on the ductwork.

- IECC-2025-2 [R403.3.8] - ductwork buried within ceiling insulation.
- **Disapproved**

6. ACCA Manual D - Residential Duct System Sizing

- Standards Task Team held regular meetings for revisions to Manual D.
 - Draft was sent to a review committee for final review.
 - Manual D went out for 45-day ANSI public review on February 23rd.
 - Due date for comments was April 8th.
 - A few minor editorial comments were received which may, or may not, require a second review. TBD.

Addendum B

ASHRAE TC5.2 (Duct Design) Membership Engagement

Submitted by: Kevin Gebke & Larry Smith

Date: June 25, 2024

Background

Larry: My personal involvement with ASHRAE goes back 17-years (2007) with my first conference meeting in Nashville. There was a handful of retired engineers including Herman Behls, and likewise, an equal number of manufacturers along with a SMACNA representative. During the subcommittee meeting I did not speak, and Herman and the other engineers invited me to join them for dinner. I left the main meeting early on Tuesday to catch a plane and missed the drama between the committee and SMACNA!

Kevin: My personal involvement goes back a few years more than Larry. The very first TC meeting I attended was in 1995, but it was TC 2.2 Plant and Animal Environment, back when I was focused on the agricultural industry. At that time, I really didn't get what it was all about. Skip a few years and I attended a TC 5.2 meeting in 2004 in Anaheim and I met Herman. I mentioned that I'd like to get involved and Herman introduced me to how ASHRAE works.

During our tenure this committee has made a tremendous contribution to ASHRAE (this is not a complete list):

1. Web based Duct Fitting Database and recent upgrades
2. Research for Duct Fitting Database loss coefficients
3. Duct Design Guide
4. ASHRAE 215 MOT
5. Deleted from the Handbooks references to seal class and leakage class
6. Air leakage criteria established as a percentage of design airflow
7. Conducted research to determine pressure drop in flexible duct
8. ASHRAE/ADI Ductulator
9. Added language to the Handbooks suggesting flex duct is limited to 5-foot maximum
10. Handbooks contain a robust commentary regarding air leakage and the impact on energy
11. Computation Fluid Dynamics shoot out competition and associated research
12. Pressure drop with close coupled fittings (experimental and CFD)
13. Herman and Dorthy Behls Endowment Fund

Where are we today (2024)

During the last meeting in Chicago Kevin and myself requested that TC5.2 establish a membership engagement committee. The sole purpose is to do exactly that...membership engagement. Unfortunately, no one volunteered, even after we are extending the call for members.

A survey was sent, and 26 members responded. The survey results are posted on the TC5.2 Basecamp. I will not drill into the details.

By my straw count out of the approx. 90 listed on the current roster (affiliated companies not always named in roster)

1. 60% manufacturer
2. 15% org/govt
3. 10% engineer
4. 10% contractor
5. 5% academic

My count of the voting members:

1. 5 – manufacturer
2. 1 – org/govt
3. 1 – contractor

Reviewing the meeting minutes over the 4-years we have always had a large attendance of people, however, always a lack of people willing to step up and volunteer to do meaningful work. We continue to talk about programs, ALI, Strategic Plan, research, handbooks, Action Items, etc, however, what are we going to accomplish and **who is carrying the torch?**