

These meeting minutes are
draft meeting minutes of
ASHRAE Technical
Committee 5.2.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.
1791 Tullie Circle, N.E.
Atlanta, GA 30329
404-636-8400

TC MINUTES COVER SHEET

TC/TG/TRG NO TC 5.2 DATE February 7, 2023

TC/TG/TRG TITLE Duct Design

DATE OF MEETING February 7, 2023 3:39 PM Eastern Time LOCATION Atlanta (Hybrid)

MEMBERS PRESENT	TERM TO	MEMBERS ABSENT	Y E A	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
John Constantinide, Chair	6/30/23			Dr. Jamie Fine, Handbook, CM
Cindy Bittel, Vice Chair	6/30/25			Ralph Koerber, Code Interaction, CM
Akshay Bhargava, Secretary	6/30/23		X	Christopher Ruch, Webmaster, CM
Robert Reid, Programs	6/30/23			
Kevin Gebke, Research	6/30/23			
Patrick Brooks, DFDB	6/30/25			
Dr. Stephen Idem, Endowment	6/30/23			
Vikram Murthy *	6/30/23			
Randy Young, Membership	6/30/23			

* 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

DRAFT

**ASHRAE 2023 WinterConference
ASHRAE TC 5.2 Duct Design
FULL COMMITTEE MEETING**

AGENDA

Tuesday, February 8, 2023

Time: 3:30 PM – 5:30 PM Eastern Time

**Location: Omni Atlanta Hotel at CNN Center, 100 CNN Center
Atlanta, Georgia, 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 – John Constantinide**

“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) Recognise attendees
 - b) Quorum reached. Yes, 8 out of 9 voting members attending (Requires 5 present)
 - c) Corrections/additions and approve agenda
 - i) Moved by Randy, seconded by Chris Wright, agenda approved.
- 4) 2022 September Interim Meeting Minutes**
 - a) Toronto Minutes were approved in September Interim Meeting.
 - b) The DRAFT minutes are posted to Basecamp in the Files > Minutes folder for Voting Members to review.
 - c) Approval of Minutes
 - i) Randy moved, Bob Reid seconded. 8-0-0, Minutes Approved.
- 5) Reminders – John Constantinide**
 - 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) 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.
 - d) Virtual Meeting Protocols
 - e) TC 5.2 MBOs are reflected by our Strategic Plan and referenced on the agenda with asterisk symbols (**)

6) Section 5 and TAC Report – Kevin Marple

- a) Hightower Award Presentation
 - i) John was awarded hightower award by Craig Messmer for his involvement in Technical Committees as Chair of TC 5.2 and TC9.Space.
- b) Functional Group Evaluation Workbook form is due

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

- a) Presentation of first award recipients
 - i) First Herman and Dorothy awards were presented at president reception.
 - ii) Abdur, Eliana and Molly were awarded.
 - iii) Award winners Abdur and Eliana were present in the meeting.

8) Subcommittee Reports

a) **Membership – Randy Young**

- i) Recognize new Provisional Corresponding Members (PCMs) since June 2022.
 - 1. Mr. Mike Boudreau
 - 2. Mr. Danilo Huaman
 - 3. Mr. Abhishek Jain
 - 4. Mr. Ibrahim Shabaka
- ii) 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
 - d) Building Owners/Managers and Owner Authorized Representatives
 - e) General Contractors, Mechanical/Sheet Metal (including SMACNA Contractors, and Associated Technicians
- iii) Additional recruitment needed in categories c and d.**

b) **Handbook – Dr. Jamie Fine**

- i) Status report on 2024 Handbook Revision (Duct Construction Chapter)
 - a) Summary of changes to Handbook were posted on Basecamp.
 - b) 2024 Handbook Task list, showing current status of to-do list is also available on Basecamp.

c) **Programs – Robert Reid**

- i) Status Report
 - a) TC 7.4 Exergy Analysis asked us today to co-sponsor a workshop.
- ii) Grassroots Outreach Update**: 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) Update from Chris Ruch and Randy Young on chapter program about ducted return
 - b) Update from Larry Smith and Kevin Gebke about a possible seminar on DDG and DFDB to chapters
 - a. Larry and Kevin working to coordinate with Dr. Idem and create possible seminars.

- iii) Distinguished Lecturer Nominations^{**}: Aim for Strategic Plan goal of nominating DL candidates to CTTC to address one or more topics on duct systems leakage.
 - a) Completed. Pat Brooks was nominated and selected for the DL Program.
- d) **Duct Design Guide (DDG)** – Larry Smith
 - i) Create an education program utilizing content from the Duct Design Guide.^{**}
 - a) Larry Smith provided an update from ALI
 - ii) Create a plan to publicize the Duct Design Guide education program to ASHRAE and non-ASHRAE members.^{**}
 - a) Status on DDG/DFDB program at the AHRI Expo coinciding with the Atlanta Winter Conference
 - iii) Status of SI Version of DDG
 - a) Dr. Jamie Fine is to coordinate with Bernado on creating SI Version of DDG.
- e) **Duct Fitting Database^{**} (DFDB)** – Dr. Jamie Fine and Larry Smith
 - i) Income from Duct Fitting Database was \$40,000 in last 12 month and \$167,000 in its lifetime.
 - ii) A presentation was given at AHRI Expo, 50+ people in attendance.
 - iii) Subcommittee Report – Refer to Appendix A.
 - iv) Create a user guide assisting practitioners with utilizing the Duct Fitting Database, with a timeline for publication of the user guide.^{**}
 - a) User guide is completed and
 - ii) Organize at least one (1) conference workshop or a TC-sponsored session that trains professionals on the Duct Fitting Database and accompanying user guide.^{**}
 - a) Refer to update in 8d(ii)(a).
- f) **Research** – Kevin Gebke
 - i) Status of RTAR 1941
 - a) RTAR was approved/accepted with minor comments.
 - ii) Bob Reid – RTAR Proposal: “Duct Take-offs, Taps”
 - iii) Brandon Cudequest – WS 1919 Overview
 - a)
 - iv) RTAR Proposal for Return Duct and Open Plenum Comparison – Chris Ruch; Refer to **Addendum A**.
 - a) Chris and Sarah presented RTAR.
 - b) Randy made motion to proceed with RTAR as written. Cindy seconded. 8-0-0. Motion to submit RTAR proposal to RAC approved.
 - a. ACTION ITEM – Kevin Gebke to take this RTAR proposal to submit to RAC.

Motion to adjourn made by Kevin Gebke, Vikram second, with no objections. Adjourned at 5:28 pm. Remaining to be continued in the Interim meeting.

- g) **Codes & Standards Interaction** - Ralph Koerber
 - i) Refer to Appendix B.

- h) **Webmaster** – Chris Ruch
 - i) TC 5.2 Website: <https://TC0502.ashraetcs.org/>
 - ii) Website updated with link for “How to join TC 5.2” and description for Herman Behls award.

- i) **Historian** - Bob Reid
 - i) Status on Herman Behls Library.

9) Deadlines

10) Notifications

11) Action Items

TC 5.2 Duct Design Action Items			
Number	Description	Assigned to	Status
1	Feedback for Duct Construction handbook chapter will be solicited.	Jamie Fine	Ongoing.
2	Create an ASHRAE chapter seminar on ducted returns	Chris Ruch & Randy Young	Ongoing.

12) New Business

- a) SSPC 90.1 Mech Subcommittee Armin Hauer

13) Adjournment

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

Addendum A

Open-Plenum Indoor Air Quality Research Project

Sarah Haines, Assistant Professor
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Helen Stopps, Assistant Professor
Department of Architectural Science, Toronto Metropolitan University
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Background Information

Several concerns have been identified with the use of open-plenum air returns (see “Return Ductwork Requirement for Airborne Pathogens” white paper by TC 5.2) such as reduced exposure control, infiltration, reduced source control, etc.

However, no field study research has validated and assessed the performance and indoor air quality (IAQ) challenges associated with open-plenum returns. Through the proposed research we will conduct field testing and chamber experiments to characterize exposure risks (e.g., supply air contaminants, exposure during maintenance, etc.) comparing open-plenums and ducted return systems.

Research Objectives

The indoor air quality impacts of different return ventilation types (open-plenum vs ducted return) in different building use types (educational facilities, medical office facilities, office spaces) will be characterized. The work will address the following questions:

1. If and how contaminants (chemical, microbial, pathogens) enter return airstreams in return-ducted and open-plenum return ventilation streams.
2. The extent of exposures to occupants and maintenance personnel through:
 - o Standard operation/ventilation air supply in the building
 - o Maintenance activities which cause disturbances in open-plenum returns.

Approach

A comprehensive approach involving multiple methods will be employed to evaluate the ventilation system's performance in relation to the research goals.

1. Characterization of contaminants present in return ventilation systems

This investigation will identify specific contaminants present in return ventilation systems and identify their sources. For example, the work will consider what contaminants build up in air returns (by continual exposure to return air) or originate in the return (specifically for ceiling-plenum returns - e.g., rodent

droppings, water leaks, mold, infiltration from outside, construction materials, asbestos, etc.). This will be achieved through collection of dust swab samples on the interior surfaces of the air returns and the application of filter forensics. Dust swab samples will be analyzed to (1) determine microbial composition (e.g., presence of bacteria, mold, viruses), (2) identify the presence of semi-volatile organic compounds (SVOCs), and (3) characterize the particulate matter present on surfaces in the system. Quantitative filter forensics will be used to identify the airborne contaminants in the system using a similar analysis approach to the dust samples. Portable micro-air cleaners will be placed throughout the return ducts to enhance the capture of contaminants and allow for filter forensics analysis at different locations through the ventilation system. This will also allow for quantification of airborne concentrations. Additionally, make-up air unit return air filters will be tested.

2. Occupant exposure during standard building operations

In addition to the assessment of return air contaminant concentrations, the presence of contaminants in supply air will also be assessed. The same techniques as applied in the characterization of return ventilation contaminants will be applied. In addition to in-duct testing, the air quality of occupied spaces will be characterized through the deployment of portable air cleaners, the filter of which will be analyzed using filter forensics.

3. Worker exposure during maintenance activities

Resuspension of contaminants in open-air return plenums will also be assessed to determine workers exposure during maintenance activities. This will be investigated through both field and lab testing. Field testing will consist of a series of controlled tests which simulate maintenance activities (e.g., raising and lowering drop ceiling panels, etc.). During these activities, particle counters will be used to collect data on airborne contaminant concentrations. Lab testing will be used to supplement this field testing. The composition of contaminants present on return ventilation surfaces will be replicated in a resuspension chamber to allow for more accurate measurements.