

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 July 28, 2014

TC/TG/TRG TITLE Duct Design

DATE OF MEETING July 1, 2014 LOCATION Seattle, WA

MEMBERS PRESENT	TERM TO	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Larry Smith, Chair	6/30/15			Cindy Bittel, CM
Robert Reid, Vice Chair	6/30/14			Patrick Brooks, CM
Herman Behls	6/30/17			Timothy Eorgan, CM
Wesley Davis	6/30/16			John Gierzak, CM
Kevin Gebke	6/30/17			John Hamilton, CM
Steve Idem	6/30/16			Robert Hassler, CM
Ralph Koerber	6/30/16			Mark Hooks, CM
Gary Miller	6/30/16			Edward Koop, CM
Vikram Murthy	*			Bruce Meyer, CM
Mark Smith	6/30/15			Michael Resetar, CM
Bill Stout	6/30/17			Mark Terzigni, CM
Craig Wray	6/30/17			Mike Wolf, CM
				Chris Van Rite, CM
				Scott Hobbs, PCM
				Andrew Phelps, PCM
				Kent Anderson, G
				Kay Clark, G
				Juan Hincapie, G
				Tasuku Imanishi, G
				Tim Kuski, G
				Tim Mathson, G
				Andrew Mitchell, G
				Shawn O'Hara, G
				Justin Prosser, G

* Member Non-Quorum

CM = Corresponding Member

PCM = Provisional Corresponding Member

G = Guest

DISTRIBUTION

All Members of TC plus the following:	
TAC Section Head	Ken Peet
TAC Chair	Walter Grondzik
2017 Handbook Liaison (Fundamentals)	Larry Akers
2016 Handbook Liaison (Systems & Equipment)	Annette Dwyer
RAC Liaison	Piotr Domanski
Standards Liaison	Rick Larson
ALI/PDC	Hugh McMillan
Chapter Tech Transfer	James Arnold
Manager of Research & Technical Services	Mike Vaughn

**AMERICAN SOCIETY OF HEATING, REFRIGERATION AND
AIR-CONDITIONING ENGINEERS**

**1791 Tullie Circle, N.E.
Atlanta, GA 30329**

ASHRAE Summer Conference, Seattle, WA.

TC 5.2 Duct Design

Tuesday, July 1, 2014

Time: 3:30-6:00 PM

Location: Room 606, Washington State Convention Center

- 1) **Call to order:** Chairman Larry Smith called the meeting to order at 3:30 PM
- 2) **Introductions and Attendance**
 - i. Introduction of people present
 - ii. Quorum- 12 members present- Quorum was met.
- 3) **NYC (Jan 2014) Meeting Minutes.**

Minutes from the NYC meeting were approved March 24, 2014 7/0/0 CNV by electronic ballot.
- 4) **Special Announcements**
 - i. Panel Discussion @ 5:00 PM regarding lined ductwork
 - ii. Review agenda – additions and/or corrections. None.
 - iii. ASHRAE Code of Ethics – “As members of ASHRAE or participants in ASHRAE committees, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct.”

5)

Subcommittee Reports

- i. Section Head 5.0 Highlights
 - a. All handouts for this meeting are posted on the TC 5.2 website.
 - b. 2015 conference session tracks published for winter conference in Chicago and the annual conference in Atlanta.
 - c. ASHRAE2014 is the internet access code (Seattle hotel only).
 - d. CEC is looking for suggested future tracks for the winter 2016 conference. It was suggested that track be built around TC 5.2 Duct Design Guide.
 - e. Please update on line your ASHRAE bio.
- ii. TC 5.2 VISION (Larry Smith)
 - a. ASHRAE Duct Design Guide
 - b. Historian - Digitize and catalog all historical records from various members
 - c. Membership chairperson - planned roadmap to voting member and leadership positions
 - d. Mentoring new members with the technical aspects of the TC and ASHRAE procedures
 - e. Get contractors involved (maybe through TC 7.2, HVAC&R Construction and Design Build Technologies)
 - f. Education Internal to the TC and external to other TC's on the technical aspects of the TC 5.2
 - g. Improve the SMACNA / TC 5.2 working relationship
- iii. Honors and Awards (Steve Idem). Nothing to report.
- iv. Handbook (Kevin Gebke)
 - a. 2016 Systems and Equipment Handbook, Duct Construction. Provide comments by 1 Jan 2015.
 - b. 2017 Fundamentals Handbook, Duct Design. Provide comments by 1 Jan 2016.
- v. Membership
 - a. Cindy Bittel with Membership reported that 21 people responded to the mentorship program survey. It was unanimously felt that having a program in place would be beneficial to the TC and 4 people expressed interest as mentors, 4 as protégés. Mentor pairs will be matched by the committee for 1 year terms beginning mid July 2014. Meals around conference meetings will be scheduled for January, and availability by phone/email throughout the year will be encouraged. Copies of the survey results are posted with the meeting minutes on the website.
 - b. Cindy will be tracking participation with the TC to fine-tune the roster and determine when members should transition and who is active/inactive.
 - c. One voting member will be rolling off July 1 (Bob Reid), and two corresponding members, Tim Eorgan and Scott Hobbs, will become voting members. In June 2015, Larry Smith and Mark Smith roll off as voting members and there is space for new additions.
- vi. Programs (Steve Idem)
 - a. Seminar on 1July2014 @ 9:45AM) – Performance of Metal and Textile Air Dispersion Systems- Sponsor

was 5.02 Duct Design; Chair, Steve Idem, with Kevin Gebke, Scott Hobbs and Bob Reid presenting. The seminar was well attended by 35 people with 5 new attendees volunteering to review the Duct Design Guide. The presentation will be posted on the TC website.

- b. Monday sub-committee – A 2-hour discussion on flex duct air and duct connectors was presented by Ralph Koerber. The presentation will be posted on the TC website.
- c. A panel discussion at the end of this meeting will address lined ductwork

vii. Duct Design Guide (Pat Brooks)

- a. The Duct Design Guide (DDG) Subcommittee met on Monday 6/30/14 from 8:00 a.m. to 9:30 a.m.
- b. We mostly discussed the vote count on the various chapters and Appendixes that are on the shared web site (DDG Subcommittee Notes 6-30-14).
- c. Voting Members of TC 5.2 who voted on the chapters included: Herman Behls, Bill Stout Jr., Craig Wray, Kevin Gebke, Robert Reid, Vikram Murthy, Steve idem, Gary Miller, Ralph Koerber, and Larry Smith. Publication approved 10-0-0-2 (Wes Davis, Mark Smith not responding), assuming all comments are resolved. All substantive changes will be sent out to voting members for approval.

viii. Special Award (Steve Idem);

ix.



ASHRAE BYLAWS – June 2012

Section 1.3 Objectives. The Society is organized and operated for the exclusive purpose of advancing the arts and sciences of heating, refrigerating, air conditioning, and ventilating, the allied arts and sciences, and related human factors for the benefit of the general public, as defined in the Certificate of Consolidation. To fulfill its role, the Society shall recognize the effect of its technology on the environment and natural resources to protect the welfare of posterity.

By electronic ballot let the minutes of this meeting reflect the unanimous vote of this committee (11/0/0 CV and 1 absent).

In affirmation of the objectives of the Society as detailed in Section 1.3 of the bylaws for the American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. we hereby dedicate this Duct Design Guide to Herman F. Behls, P.E.

- x. ASHRAE Learning Institute (ALI) (Pat Brooks)
 - a. For the ASHRAE Duct Design Guide a proposal will be sent to the ALI (Karen Murray) for approval by the ALI.
 - b. Instructors needed. Potential instructors are Pat Brooks, Kevin Gebke and Cindy Bittel,
- xi. Webmaster (Mark Smith)
 - a. Chair reports that TC 5.2 website is up to date.
 - b. Chair complimented Mark on his work in keeping the website current.
- xii. Liaison Reports
 - a. MTG.EAS (Larry Smith)
 - a1. Name change to MTG.HPAS (High Performance Air-Handling Systems for Buildings Except Low Rise Residential Buildings)
 - a2. ASHRAE Exchange forum for MTG is operating with all 38 ideas posted
 - a3. Further discussion under future work statements
 - b. 90.1 Reported by Craig Wray; SSPC 90.1 voted in Seattle to recommend to Standards Committee (StdC) that the following two proposed changes be released for publication public review (PPR) after the Seattle meeting:
 - 1. That the fan-power-related static pressure credit for return and exhaust ducts in Table 6.5.3.1 be changed to limit its scope, such that the credit will only be available for returns and exhausts that are required by code or an accreditation standard to be fully-ducted, or for systems required to maintain air pressure differentials between adjacent rooms.
 - 2. That Section 6.4.4.2.1 be modified to make it clearer that ductwork and all plenums with pressure class ratings shall be constructed to Seal Class A. The change is to avoid possible misinterpretation of the existing text that a different seal class might be acceptable. There was no change proposed to the exception that "spiral lock seams need not be sealed".
 - c. 189.1 (Scott Hobbs) Scott attended the meeting and is getting a firm understanding of the scope and terminology.
- xiii. Research (Herman Behls)
 - a. RP 1606 – Lab Testing of Flat Oval Transitions to Determine Loss Coefficient
 - a1. Contractor: University of Illinois at Urbana-Champaign, Department of Agricultural and Biological Engineering.
 - a2. Investigators: Yigang Sun, PhD, Senior Research Engineer, Steve Ford, Research Engineer.
 - a3. PMS: Herman Behls, Chair with Pat Brooks, Dr. Steve Idem and Bob Reid.
 - a4. Final report approved by email ballot 10-0-0-2, voting period closed 20June2014

- b. RP-1682- Study to identify CFD Models to Determine HVAC Duct Fitting Loss Coefficients
- b1. Contractor: Embry-Riddle University, Prescott Arizona
 - b2. Sub-Contractor: Tennessee Technological University (Dr. Steve Idem).
 - b3. Investigator: Dr. Ahmad Sleiti
 - b4. PMS: Herman Behls with Kevin Gebke, Dr. Emir Sirbubalo (Sarajevo, Bosnia) and Craig Wray
 - b5. Status Contract initiated 7July2014
- c. Work Statement
- c1. Title: Cost Effectiveness of HVAC System Air Leakage Tests during Operation (MTG.HPAS #028)
 - c2. Scope: To determine the economics (pay-back period) for leakage testing both new and existing non-residential HVAC systems. Systems are to be tested in compliance with ASHRAE Standard 215P, Method of Test to Determine Leakage Airflows and Fractional Leakage of Operating Air-Handling Systems.
 - c3. Authors: Herman Behls and Jeff Boldt.
- d. Future work statements (Larry Smith / Herman Behls)
- d1. **MTG-EAS-005:** "Evaluate Heating & Cooling Delivery Systems" (Larry Smith and Dr. Mark Modera)
 - Evaluate alternate methods of delivering BTU's to a space and associated energy use.
 - Space, energy, maintenance as well as different building envelopes and geographic locations are to be considered.
 - Include emerging technologies as well as current practices.
 - d2. **MTG.EAS Idea 12:** "Terminal Unit Published Noise Ratings" (Herman Behls / Jeff Boldt) Herman Behls discussed with Jeff Boldt. Using an AHRI Excel spreadsheet, Herman will calculate the octave band sound levels that can be expected from various arrangements of downstream ductwork without duct lining and flex duct, and in consultation with Jeff put the results into the Acoustics chapter of the ASHRAE Duct Design Guide.
 - d3. **MTG.EAS Idea 26:** "Energy Impacts from Air Handler Casing Leakage" (Herman Behls/Julie Ferguson)
 - d4. **MTG.EAS Idea 27:** "Determine Air Leakage of Duct Transverse Joints and Associated Energy Costs" (Bob Reid).
 - d5. **MTG.EAS Idea 29:** "Air Leakage of Duct-Mounted Equipment" Herman discussed with Jeff Boldt. Herman Behls will prepare a Work Statement with Jeff for leakage testing of VAV terminal units and other duct mounted equipment where leakage data is not available. Herman Behls will take the lead.
 - d5. **MTG.EAS Idea 37:** "Cost Effectiveness of HVAC System Air Leakage Tests during Construction." Herman discussed with Jeff Boldt. Herman Behls will prepare a Work Statement in consultation with Jeff for developing the economics (feasibility) of air leakage testing of entire HVAC systems with emphasis on systems 3 in. water and below. Jeff Boldt will develop the scope.
 - d7. **MTG.EAS 38:** "Economics of Airtight Non-Fan-Powered Single-Duct Terminal Units" (Jeff Boldt)

xiv. Standards

- a. SMACNA/ASHRAE Co-sponsored Standard (BSR-SMACNA 023) (Mark Modera/Jeff Boldt). No action reported by Herman Behls.
- b. SPC 120-2008R (Kevin Gebke). First and second public review completed. No comments were received. Based on comments by the RP-1606 contractor (University of Illinois) SPC 120 will require a third public review.
- c. SPC 126-2008R (Kevin Gebke). SMACNA's BOD approved the standard for public review. Public review period is July 11 to Aug 15.
- d. SPC 215P MOT to Determine Leakage Airflows and Fractional Leakage of Operating Air Handling Systems (Craig Wray). Craig reported that SPC 215P held their first meeting in Seattle on June 30, 2014 to discuss the standard's title, purpose, and scope; work plan; and working draft outline. Planned key milestones are a PC vote for publication public review around mid-December 2014 and a vote for final publication in June 2015.

6) **Deadlines**

- i. None

7) **Old Business**

- i. ASHRAE/ADI Duct Size Calculator (Chris VanRite) Chris reported that Dr. Idem is doing a study at Tennessee Tech to verify the equations and calculations, and that ADI is considering both a slide-chart and an App. If necessary, there will be an electronic vote in the next 6 months.

8) **New Business**

- i. Chair Larry Smith formed a code and standards interaction sub-committee so that the TC is aware of all proposed code and standard changes. Codes and standards of interest are IMC, IECC, IAPMO, UL 181, 181A, 181,B, NFPA 90A, NFPA 90B, 90.1, 62.1 and 189.1. The following have agreed to participate in this effort: Ralph Koerber (chair), Dave Dais, Kevin Gebke, John Hamilton, and Mark Smith.
- ii. IMC and the flex duct length issue (teleconference April 11, 2014).

The chair Larry Smith made the following motion, seconded by Ralph Koerber. The vote of the flex duct length conducted April 11, 2014 by email vote 9/2/0 CV for the following motion, seconded by Ralph Koerber:

It is the recommendation of the ASHRAE technical committee TC 5.2 duct design that any code language limiting the length of flexible duct or air connectors, due to language in the ASHRAE Handbook as referenced above, to 5 or 6 feet be stricken.

Motion passed 9-2-0-2 CV.

Background. The ASHRAE 2009 Fundamentals Handbook (page 21.7 and 21.18) reads "for commercial systems, flexible ducts should be... no more than 5 ft in

length, full stretched.” This is also included in the more recent 2013 handbook; however, the limiting length recommendation was changed to 6 feet. This was intended to give design guidance to the engineer and was never intended to be included in code *language such as "shall be limited to 5 feet."*

The following voting members were present for the vote:

1. Herman Behls
2. Wes Davis
3. Kevin Gebke
4. Ralph Koerber
5. Gary Miller
6. Vikram Murthy
7. Bill Stout
8. Craig Wray
9. Larry Smith

Voted in the negative:

1. Mark Smith – Mark Smith voted negative because he maintains that the length of flexible duct should not exceed 5 ft.

The following voting members were not present:

1. Dr. Steve Idem
2. Bob Reid

The following people were also in attendance:

1. John Hamilton
2. Tim Eorgan

9) Action Items

TC 5.2 (Duct Design) Action Items			
Number	Description	Assigned to	Status
1	Investigate DFDB App (Staff Contact) 1. Staff Contact: Steve Comstock 2. Developed by Carmel Software 3. App not maintained by ASHRAE 4. TC 5.2 not consulted	Kevin Gebke	Completed Jan2014
2	Distribute TC 5.2 Vision Statement	Larry Smith	Completed Jan2014
3	Comparison of DFDB fittings vs. plasma machine libraries or current manufacture’s catalog	Larry Smith, Herman Behls	Active
4	Submit “Air Diffusion System” seminar documentation for Seattle.	Steve Idem	Completed Jan2014

5	Submit "Matching Fan Selections with System requirements" seminar documentation for New York.	Steve Idem	Completed Jan2014
6	Ad-hoc committee initiated for advocacy objectives for air distribution systems in existing and new buildings	John Hamilton Erik Emblem	Active (Initiated Jan2014)
7	Submit proposal to ALI for Duct Design Guide	Pat Brooks	Active (Initiated Jan2014)
8	Submit to Standards Committee Scott Hobbs as TC 5.2's liaison to SSPC 189.1	Larry Smith	Completed Jul2014
9	Change TC 5.2 Liaison to 90.1 from Larry Smith to Craig Wray	Larry Smith	Completed Jul2014
10	Bob Reid to work with Ralph Koerber on making a recommendation to TC 5.2 regarding the language concerning flexible duct and duct connectors	Bob Reid	Active (Initiated Jul2014)

10) Seminar on double wall duct work using fiberglass (5:00 – 6:00 PM)

11) Adjournment at 6:00 PM

Motion by Bob Reid
2nd by John Hamilton
Vote was unanimous