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 August 16, 2012

TC/TG/TRG TITLE Duct Design

DATE OF MEETING June 26, 2012 LOCATION San Antonio, TX

MEMBERS PRESENT	TERM TO	MEMBERS ABSENT	TERM TO	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Mark Terzigni (chair)	6/30/2013	Johnny Anderson (non quorum)	6/30/2013	Steve Idem (CM)
Larry Smith (vice chair)	6/30/2015	Bass Abushakra	6/30/2012	Kevin Gebke (CM)
Bob Reid (sec.)	6/30/2014	Chris Van Rite	6/30/2013	Mark Smith (CM)
Herman Behls	6/30/2012			John Gierzak (CM)
Pat Brooks	6/30/2013			Gary Miller (CM)
John Hamilton	6/30/2013			Tim Eorgan (CM)
				Eli Howard (CM)
				Bill Stout Jr. (CM)
				Mark Modera (CM)
				Vikram Murthy (CM)
				Craig Wray (CM)
				Laura Petrillo
				Dennis Flores
				Scott Hobbs
				Robert Hassler
				Edward Koop
				Kent Anderson
				Tim Orris
				Bruce Meyer
				Matthew Daugherty
				Joshua Kading
				Ahmad Sleiti (PCM)

DISTRIBUTION

All Members of TC plus the following:	
TAC Section Head	Giustino Mastro
TAC Chair	Charles Culp
2016 Handbook Liason	Annette Dwyer
2013 Handbook Liaison	James Aswegan
RAC Liaison	Piotr Domanski
Standards Liaison	Krishnan Gown
Special Pubs	William Fleming
ALI/PDC	John Nix
Manager of Research & Technical Services	Mike Vaughn

AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONIONG ENGINEERS
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ASHRAE Annual Meeting, San Antonio, TX
TC 5.2 Duct Design

Tuesday, June 26, 2012
Location: Bonham C
Time: 3:30 – 6:00 pm

2011/2012 Roster:

Voting Members (10): Mark Terzigni (Chair), Larry Smith (Vice Chair), Bob Reid (Secretary), Herman Behls, Johnny Andersson (non-quorum), Pat Brooks, Bass Abushakra, John Hamilton, Chris VanRite

Corresponding Members (CM): Kevin Gebke, Steve Idem, Tom Ponder, Marcus Bianchi, Charlie Culp, Wes Davis, Tim Eorgan, John Gierzak, Mark Hooks, Eli Howard, Ralph Koerber, Bruce Meyer, Gary Miller, Vikram Murthy, Vernon Peppers, Mike Resetar, Donald Seibert, Mark Smith, Bill Stout, Craig Wray

Provisional Corresponding Members: Jeff Boldt, Erik Emblem, Norman Grusnick, Vishal Jadawala, Mark Modera, Ahmed Sleiti

1. **Call to order**: Chairman Mark Terzigni called the meeting to order at 3:30 PM

2. Introduction/Attendance

a. Voting Members Present: Mark Terzigni, Bob Reid, Larry Smith, Herman Behls, John Hamilton, Pat Brooks.
b. Voting Members Not Present: Johnny Andersson (non-quorum),Bass Abushakra, Chris Van Rite.
c. Corresponding members: see cover sheet of attendees.
d. Provisional Members: see cover sheet of attendees.
e. Guests: see cover sheet of attendees.
f. There is a quorum for the meeting (6 of 8 voting members present).

3. Chicago (January 2012) Meeting Minutes

- Minutes are posted on the T.C. 5.2 Web site. Minutes approved by email vote ending 4/4/12. Approved 6-0-2 (10). Andersson and Evans abstained because they were not in attendance. Abushakra and Hamilton not voting.

4. Section Head Report (Gus Mastro- Section Head, Mark Terzigni TC 5.2 Chair)

a. Hightower Award nominations are due by September 1st
b. Conference papers for the Dallas meetings are due by July 9th
c. Dallas conferences are scheduled on Transportation and Industrial Ventilation Systems

5. Subcommittee Reports

a. Handbook (Kevin Gebke, Chair)

- Duct Design, Chapter 21, Fundamentals, 2013 --- Due January 1, 2013

- The Duct Design chapter is out for review and the comment period has passed. Nine (9) substantive comments have been received. Substantive comments approval by October 15th. The time frame for submission to the ASHRAE editor is the end of January, 2013.

b. Membership (Mark Terzigni TC 5.2 Chair)

- Abushakra and Behls will roll off. Rich Evans has resigned.
- New voting members will be Steve Idem, Mark Smith, Wes Davis, Ralph Koerber and Gary Miller.

c. Programs (Steve Idem, Chair)

- Dallas (January 2013): Possible presentations from the four papers from the "CFD Shootout Contest".
- Denver (June 2013): Possible seminars or short courses in conjunction with the "Duct Design Guide".

d. Special Publications

- ASHRAE Duct Fitting Database (Herman Behls, Administrator)
  1. Herman recommends adding an administrator position for the Duct Fitting Database to the TC5.2 roster.
- Duct Design Guide: (Pat Brooks, Chair)
  1. The subcommittee met Monday at 10:00 AM (see attached roster) and reviewed the Table of Contents (TOC). Refer to the list of shared files for the TOC.
  2. Chapters were assigned for review. The first round of reviews is due August 31st. After comments are reviewed it is expected that they will be resolved by the first of the year. For assignments refer to "Duct Design Subcommittee Notes 6-25-12" on the list of shared files.
  3. Expected completion date for the Duct Design Guide is spring 2013.
  4. Shared file location: http://unitedmcgill.com/6d48ff3195. The shared file location is protected, so you will need the user name "ASHRAE" and a password "MEMBERS" (without quotes) to access it. Pat requests that if you edit a chapter or appendix please use "tracking". Use initials and date when re-sending back to Pat/Herman.

e. Research (Herman Behls, Chair)

- RP 1606: Laboratory Testing of Flat Oval Transitions to Determine Loss Coefficients
  1. The project is proceeding, although there is a bit of a learning curve involved.
  2. Completion is scheduled for January 31, 2013.
- RP 1493 "CFD Shootout" --- the project is completed and we are waiting on presentation of papers and the award to winners.
- URP 1672 --- this is proposed unsolicited research to combine CFD with experimental data to fix the differences and see if the results can be useful for modeling duct/fitting performance. RAC recommended that the URP be converted to a work statement. Herman Behls made a motion, seconded by John Hamilton, to convert this to a work statement. The motion passed 5-0-0 (CNV).

6. Standards (Tom Ponders, Chair)

- SPC 120-2008R -- MOT Flow Resistance of HVAC Duct and Fittings --- Kevin Gebke, chair
  1. Moving forward and looking for committee balance
  2. Looking to approve membership in October (Kevin Gebke, Herman Behls, Pat Brooks, Allison Fee, Steve Idem)

- SPC 126-2008R -- MOT HVAC Air Ducts (Kevin Gebke, Chair)
  1. Moving forward and looking for committee balance
  2. Looking to approve membership in October (Kevin Gebke, Herman Behls, Eli Howard, Ralph Koerber, Gary Miller)

7. Website (Mark Smith, Webmaster)

- Please review TC 5.2 Web site and forward comments to Mark Smith.

8. Awards: (Dr. Idem)

- Nothing to report.

9. Deadlines

- 2013 Handbook: Duct Design chapter --- Due January 1, 2013

10. Unfinished Business: None

11. New Business

a. A **Multidisciplinary Task Group (MTG.EAS)** --- a link will be sent to all individuals on the MTG.EAS roster. It is requested that we all come up with 3 ideas for proposed study.

b. **AMCA Certified Rating for Ducts** --- copies made available to TC5.2

c. **Standard 90.1: Duct Leakage Test.** Larry Smith made a motion to approve the presentation of a proposed change (see attached document "ASHRAE Standard 90.1-2010 --- Proposed Change") produced by TC5.2's Duct Leakage Subcommittee to the full Standard 90.1 Committee (Attachment A). Second by Bob Reid. There was much discussion. Mark Terzigni and Eli Howard stated their belief that this proposed change circumvented an ASHRAE/SMACNA agreement for developing a duct system leakage standard. Laura Petrillo with AHRI expressed concerns regarding a memo of understanding between ASHRAE and AHRI. Others, including Smith, Reid, Behls and Wray, argued this proposal was the result of the work of the duly formed TC5.2 Duct Leakage Subcommittee formed for this purpose and followed recommendations already put into the Handbook. The motion was approved 5-0-0 (CNV).

12. Adjournment

- Bob Reid made a motion to adjourn. Larry Smith second. Passed unanimously.

Next Meeting --- 2013 ASHRAE Winter Meetings --- January 26-30 in Dallas, TX

"Attachment A"

ASHRAE Standard 90.1
Proposed Change

6.4.4.2 Air-Handling System Leakage

6.4.4.2.1 System Sealing. Ductwork shall be constructed to *seal class A* (see Informative Appendix E). Allowable leakage for duct-mounted components, such as terminal units, reheat coils, and access doors shall be specified in the design documents and the component shall be installed so that the air-handling system leakage meets the requirements of Section 6.4.4.2.2. Component leakage shall not be used for temperature control of associated motors and electronics.

All connections shall be sealed, including but not limited to spin-ins, taps, other branch connections, access doors, access panels, and duct connections to equipment. Opening for rotating shafts, wires, and pipes or tubes shall be sealed with bushings or other devices that minimize air leakage but that do not interfere with shaft rotation or prevent thermal expansion. Sealing that would void product listings, such as for fire /smoke dampers, is not required. Spiral lock seams need not be sealed.

All tape, mastic, rolled sealants, aerosol/spray applied sealants, gaskets, and non-metallic mechanical fasteners shall:

(1) be used in compliance with the manufacturer's instructions, and

(2) be tested to UL 723 (ASTM E84) and have a flame spread index equal to or less than 25 and a smoke developed index equal to or less than 50.

All joints, longitudinal and transverse seams, and connections in sheet metal ductwork shall be securely fastened and sealed with welds, gaskets, tapes, mastics, mastic-plus-embedded-fabric systems, rolled sealants, or aerosol sealants. Pressure-sensitive tapes, rolled sealants, mastics, gaskets, and aerosol sealants used to seal sheet metal ductwork shall be tested for durability using ASTM E2342 and have a minimum 60 day time to failure. Heat sensitive and heat activated tapes shall not be used as a sealant on any metal ducts. In particular, cloth-back natural latex-rubber adhesive duct tape shall not be used regardless of UL designation. For exterior applications, mastics shall be tested using ASTM C732 artificial weathering tests and show no signs of visible degradation (i.e., wash-out, slump, cracking, loss of adhesion) after being exposed to artificial weathering. Tapes shall be used only on joints between parallel surfaces, or on right angle flat joints.

Rigid fiberglass ductboard shall be sealed following standard industry practice (see Informative Appendix E) using materials listed and labeled to the UL 181A standard

Tapes, mastics, and rolled sealants used to close flexible ducts and connectors shall be listed and labeled to UL 181B, Part 1 or Part 2, be marked "181B-FX' or "181B-M" respectively, and be used in accordance with their listing.

Mechanical fasteners for use with nonmetallic flexible ducts shall be either stainless-steel worm-drive gear clamps or non-metallic straps listed and labeled to UL 181B, Part 3, and be marked "181B-C." Non-metallic fasteners shall have a minimum tensile strength rating of 150 lb force (670 N) and be suitable for continuous use at the maximum temperature to which they will be exposed. When non-metallic fasteners are used, beaded fittings are required, and the maximum duct positive operating pressure shall be limited to 6 in. of water (1500 Pa).

6.4.4.2.2 Air-Handling System Leakage Tests. System sections conveying supply air upstream and downstream of terminal units, return air, exhaust air, and outdoor air and sections with duct-mounted components shall be leakage tested using procedures identified in the design documents (see Informative Appendix E). As a minimum all outdoor sections and 25% of all other sections based on duct surface area shall be tested. Test an additional 25% of the system sections if any section fails to meet the leakage requirement and the entire system if any section fails subsequent testing. Test sections shall be selected by the owner's representative. Testing shall occur after the section to be tested is fully assembled, but prior to the installation of insulation and concealment of the test section. Test pressures and pressure class ratings shall be specified in the design documents and the test pressures shall not exceed the pressure class rating for the section being tested.

The maximum allowable leakage for each system at the design (maximum) system operating conditions shall be 5%, except for supply and return system sections that leak directly to/from outdoors (2%), exhaust systems that draw in air directly from the indoors (2%), and air-handling units (1%).

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3.2 Definitions

ductwork: consists of straight duct, flexible duct, sheet metal and rigid fiberglass plenums, and fittings (e.g., elbows, transitions, tees, wyes) for distribution and extraction of air. It does not, however, include duct-mounted components (e.g., terminal units, access doors/panels, attenuators, coils, fire/smoke dampers, balancing and control dampers).

system: consists of the supply air handler, return fan, exhaust fan, plenums, and all ductwork and duct-mounted components that connect the air-handler to the conditioned space.

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12. NORMATIVE REFERENCES

Reference	Title
ASTM C732-2006	Test Method for Aging Effects of Artificial Weathering on Latex Sealants
ASTM E84-2010	Test Method for Surface Burning Characteristics of Building Materials
ASTM E2342-2010	Test Method for Durability Testing of Duct Sealants
UL 723-2008	Surface Burning Characteristics of Building Materials

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INFORMATIVE APPENDIX E
INFORMATIVE REFERENCES

NAIMA
North American Insulation Manufacturers Association
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314

Subsection No.	Reference	Title/Source
6.4.4.2.1	SMACNA HVAC Duct Construction Standards Metal and Flexible - 2005 NAIMA Fibrous Glass Duct Construction Standard -- 2002, 5th edition	HVAC Duct Construction Standards, Metal and Flexible Fibrous Glass Duct Construction Standard -- Low Velocity Systems 2 in. w.c. (500 Pa) Maximum Static Pressure
6.4.4.2.2	AABC Duct Leakage Test Procedures -- 2002 SMACNA HVAC Air Duct Leakage Test Manual—1985	National Standards for Total System Balance Chapter 5 HVAC Air Duct Leakage Test Manual Sections 4, 6 and 7