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

TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. TC 5.1 DATE 13 February 2012

TC/TG/MTG/TRG TITLE Fans
DATE OF MEETING 23 January 2012 LOCATION Chicago, IL

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
John Murphy	2009	John Cermak	2008	[See Attached List]
Joe Brooks	2010			
Patrick Chinoda	2008			
C. W. Coward	2008			
BrentFullerton	2010			
Rad Ganesh	2011			
Tim Mathson	2010			
Kim Osborn	2010			
Brian Reynolds	2010			
Zhiping Wang	2008			

DISTRIBUTION

All Members of TC/TG/MTG/TRG plus the following:	
TAC Section Head:	Gus Mastro
TAC Chair:	Dr. Culp,III
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters:	Dr. Domanski (Research) Steven Bruning (Standards)
Manager Of Standards Manager Of Research & Technical Services	Stephanie Reiniche Mike Vaughn

Corresponding Members and Guest attendance:

F_NAME	L_NAME	Affiliation	Corres	Guest
Jenny	Abney Sivie	PennBarry	X	
Mike	Brendel	Lau	X	
Steve	Bruning	Newcomb & Boyd	X	
Peter	Bushnell	Carrier	X	
Dave	Carroll	Morrison Products, Inc.	X	
Franco	Cincotti	Comefri USA	X	
P.G. (Peter)	Danos	Johnstone Supply-Gurnee	X	
Harold	Dubensky	Johnson Controls, Inc.		X
Jay	Eldridge	McQuay	X	
Mark	Fly	AAON	X	
Danielle	Fox	Lawrence Berkeley Nat'l Lab		X
George	Gamble	Twin Cityh Clarage	X	
Armin	Hauer	ebm-papst		X
Larry	Hopkins	Huntair Inc.	X	
Joshua	Kading	Texas A&M		X
Michael	Keating	Kinetics noise Control	X	
Scott	Kurszewski	Greenheck		X
Tim	Kuski	Greenheck		X
Joshua	Lynch	Soler & Palau - USA		X
Dustin	Meredith	Trane	X	
Jane	Miller	Flakt Woods		X
Ross	Noel	Dow Corning		X
Olga	Otieno	Baltimore Aircoil co.		X
Laura	Petrillo	AHRI	X	
David	Rasmussen	Airdex Corp.	Prov.	
Asesh	RaychaudhurI	Dept of Veteran Affairs	X	
Jackie	Russo	Carrier		X
Greg	Sanchez	NYCT	X	
Bob	Valbracht	Loren Cook Company		X
Greg	Wagner	Morrison Products, Inc.	X	
Steve	Wise	Wise Assoc.		X
Kasey	Worthington	AAON Inc.		X
Craig	Wray	LBNL		X
Weber	Wu	PennBarry		X

ASHRAE TC 5.1 Meeting
Monday 23 January 2012

Chicago, IL

Minutes

1. Call to Order

The chair, John Murphy , called the meeting to order at 4:15 pm.

2. Roll Call

The following voting members of this committee were present:

John Murphy – Chair, Standards S/C Chair
Joe Brooks, Secretary
Patrick Chinoda
Chuck Coward
Brent Fullerton, Webmaster
Rad Ganesh
Tim Mathson
Kim Osborn
Brian Reynolds – Handbook S/C Chair
Zhiping Wang

John Cermak was unable to attend.

A quorum was in attendance

3. Adoption of Agenda

The agenda was adopted by consensus

4. Approval of the minutes

Motion TC 5.1-0102012 Moved by: Kim Osborn
Seconded: Zhiping Wang

"That the minutes of the last meeting of the TC held on 27 June 2011 be approved as distributed.

Passed unanimously

5. Items of business

5.1 TC 5.0 Section Head/Liaison Reports

Gus Mastro, Section 5 Section Head, joined the meeting and emphasized the following information :

- Roster update due by end of Tuesday,

- Reminded chair the activity feedback form was due after the-meeting,
- That the ASHRAE Hightower award was given to Howard Beatty of TC 9.9,
- The TC should maintain its website up to date, and
- Individual cannot claim to speak for the TC or provide a TC opinion unless authorized by TC vote.

C. Bruning, TC 5.1 standards liaison reminded the committee that action is required for standards ASHRE 149 and ASHRAE 87.2

5.2 Chairman's report

The chair reported:

- A new ASHRAE logo was recently unveiled,
- Starting at the Dallas meeting, speakers will be required to pay a registration fee ($100),
- Starting at this meeting, mini-conferences are part of the annual and winter meetings.

5.3 Committee membership report

The chair reported the following committee roster changes that will take effect on 1 July 2012:

Rolling off:
Chuck Coward
Zhiping Wang
Patrick Chinoda
John Cermak

New voting members:
Greg Wagner
Franco cincotti
Mike Brendel
Asesh Raychaudhuri
Greg Sanchez
David Rasmussen

The chair also noted that there are 33 corresponding members.

5.3.1 Nominations for TC 5.1 vice chair (to be effective 7/1/2012)

Motion TC 5.1-02-2012 Moved by: Chuck Coward
Seconded: Rad Ganesh

“To appoint Patrick Chinoda as Vice Chair of TC 5.1 effective July 1, 2012”.

Passed unanimously

5.3.2 Research Subcommittee Chair

Motion TC 5.1-03-2012 Moved by: Chuck Coward
Seconded: Rad Ganesh

"To appoint Brian Reynolds as the new Research Subcommittee chair after July 1, 2012 and after the Handbook chair has been relieved."

Passed unanimously

6. Subcommittee reports

6.1 Standards subcommittee

6.1.1 ASHRAE Standard 149

The TC discussed the options for this standard.

Motion TC 5.1-04-2012 Moved by: Tim Mathson
Seconded: Rad Ganesh

"TC 5.1 recommends that ASHRAE Standard 149-2000 (RA 2009) be reaffirmed ."

Passed: 8-yes
0 – no
0 – Abstained
2 – Not voting (including chair)

6.1.2 ASHRAE 68/AMCA 330

It was reported that the identical adoption of ISO 5137 for this standard should be underway shortly. The chair noted that ASHRAE had approved the committee and it will be meeting in February.

6.1.3 ASHRAE 51/AMCA 210

It was reported that Tim Mathson was approved by AMCA as chair of this committee and should be approved by the ASHRAE Board at their next meeting.

6.1.4 ASHRAE 87.2

The TC discussed possible recommendations for this standard.

Motion TC 5.1-05-2012 Moved by: Zhiping Wang
Seconded: Chuck Coward

"TC 5.1 recommends that ASHRAE Standard 87.2-2009, 'In-Situ Method of Testing Propeller Fans for Reliability" be withdrawn."

Passed: 7 – Yes
2 – No
0 – Abstains

1 – chair did not vote

Those voting negatively indicated that their votes were based on the belief that there is valuable information in the standard that will be lost. And, that the art of strain gage testing will be lost.

6.2 Handbook subcommittee

The chair of the Handbook Subcommittee reported that the subcommittee had completed work on the handbook revision last spring, the revision was submitted last June and that he is awaiting the galley proofs. It was thought that the proofs may not be delivered until March 2012. Some assistance may be needed at that time to review the proofs.

The next cycle of review and/or revision will begin at the next Winter meeting (Dallas). It was noted that the handbook section can always be kept current via the online handbook.

Brian Reynolds, chair of the Handbook Subcommittee asked that if anyone was interested in volunteering to take over this chair, to contact the TC 5.1 chair (John Murphy).

6.3 Research subcommittee

The chair of the Research Subcommittee, David Carroll, reported that Research Topic Acceptance Request (RTAR) submissions were declining and the RAC (ASHRAE's Research Administration Committee) is encouraging Technical Committees to submit more projects.

6.3.1 Current projects

The status of current projects was provided:

RP 1216 Inlet Installation Effects on BI/Airfoil Centrifugal Fans, Air & Sound (Rad Ganesh is chair of Project Monitoring Subcommittee) – This project is complete with the exception of a technical paper.

RP 1420, Installation Effects on Plenum Fans (Franco Cincotti is chair of Project Monitoring Subcommittee) – Franco reported that the Project Monitoring Subcommittee met with a representative of the AMCA International laboratory (Scott Ferguson) to discuss results of tests to determine if a tapered inlet is needed for all setups in the project. Some members of the Project Monitoring Subcommittee will be visiting the AMCA lab on Thursday January 26, 2012 to determine if tapered inlets will be required for the project.

6.3.2 Future projects

It was reported that feedback had been received for two submitted RTARs (a project to pull together all five system effect projects and a research project to better understand fans in series and parallel).

The committee discussed two possible projects: A project investigating parallel and series jet fans, and a project investigating discharge plenum loss effects. No RTARs have been submitted on these subjects.

6.4. Program subcommittee– Asesh Raychaudhuri

The chair of this subcommittee, Asesh Raychaudhuri, reported that this meeting program included a seminar sponsored by TC 5.1 entitled, "Comparison of Field and Laboratory Testing of Fans and Ratings."

For the annual meeting in San Antonio this June, he will submit a seminar program for Fan Efficiency Grades. Other possible program submissions for the summer meeting suggested were seminars on: Jet Fan Design and Application (suggested by Greg Sanchez), and High Plume Fans and other Niche Fans and Energy Efficiency (suggested by Chuck Coward). The deadline for submission for Seminar proposals is February 13, 2012.

For the next Winter Meeting in Dallas, a conference paper by Mark Stevens on the subject of RP 1216 was discussed. However, to make it into that program, a conference paper is required to be submitted by July 9, 2012. Committee members were also asked to think about putting a seminar together (for Dallas) on the Validation of Performance of Induced Flow Fans (perhaps have a joint sponsor with ASHRAE TC 9.10)

7. FAQ

Nothing was reported.

8. Website Report – Brent Fullerton

Brent Fullerton reported that the website was current.

9. Old Business

Patrick Chinoda requested he be relieved of his position as liaison to the Mechanical Subcommittee of SSPC 90.1.

10. New Business

Craig Wray reported that he was the Vice Chair of a new Multi-disciplinary Task Group (MTG) being formed titled, "Energy-Efficient Air-Handling systems for Non-Residential Buildings." Several ASHRAE Technical Committees were selected to provide voting and alternate members including TC 5.1. John Murphy volunteered to be the voting member. The request will be sent with the minutes to the TC. The TC was told that most meetings would be via conference call or webinar to coordinate work of the many TCs.

Motion TC 5.1-06-2012 Moved by: Joe Brooks
Seconded: Chuck Coward

"To designate John Murphy as the voting representative from TC 5.1 to the MTG.EAS."

Passed unanimously

Motion TC 5.1-07-2012 Moved by: Patrick Chinoda

Seconded: Kim Osborn

"To designate Rad Ganesh as the alternate voting representative from TC 5.1 to the MTG.EAS."

Passed unanimously

11. Time and Place of Next Meeting

The next meeting of TC 5.1 will be scheduled for June 25, 2012 in San Antonio at 4:15.

12. Adjournment

The meeting adjourned at 6:25 pm

Minutes recorded by,
Joseph A. Brooks

Attachments: 1.) MTG.EAS invitation

MTG PROPOSAL FORM

Return Form to:
Manager of Research & Technical Services
ASHRAE
1791 Tullie Circle, NE
Atlanta, Georgia 30329-2305
☎404-636-8400 • Fax 404-321-5478
E-mail: techserv@ashrae.org

Date: ***December 31, 2011***

MTG Name: ***Energy-Efficient Air-Handling Systems for Non-Residential Buildings***

MTG Scope: ***MTG.EAS*** *will coordinate activities of related ASHRAE technical and standards committees to facilitate development of packages of tools, technology, and guidelines related to the design, operation, and retrofit of energy-efficient air-handling systems in new and existing non-residential buildings. The intent is that these products can be integrated with industry processes and can be used to ensure that ASHRAE energy saving targets are met, to carry out high-profile demonstrations of improved air-handling systems, and to identify further energy saving opportunities. Within ASHRAE, the MTG also will coordinate activities to update related parts of ASHRAE Handbooks and Standards (particularly 90.1, 62.1, and 189.1) and to develop related education programs for technology implementers. Outside of ASHRAE, the MTG will monitor related activities and represent ASHRAE interests where permitted to provide a conduit for related information transfer to ASHRAE members. MTG.EAS is concerned with the interactions between non-residential air-handling system components, the building, and related activities, which include at least the activities of TCs1.4 (Control Theory and Application), 1.8 (Mechanical System Insulation), 1.11 (Motors and Motor Controls), 4.3 (Ventilation Requirements and Infiltration), 4.7 (Energy Calculations), 5.1 (Fans), 5.2 (Duct Design), 5.3 (Room Air Distribution), 6.3 (Central Forced Air Heating and Cooling Systems), 7.1 (Integrated Building Design), 7.2 (HVAC&R Contractors and Design Build Firms), 7.7 (Testing and Balancing), 7.9 (Building Commissioning), and 9.1 (Large Building Air-Conditioning Systems), as well as TRG7 (Under Floor Air Distribution), SSPC 62.1 (Ventilation for Acceptable Indoor Air Quality), SSPC 90.1 (Energy Standard for Buildings Except Low-Rise Residential Buildings), and SSPC 189.1 (Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings).*

Impact on TC/TG/TRGs and Other MTGs: *MTG.EAS will promote collaboration and information sharing between the technical and standards committees affected by the MTG scope. For each affected TC/TG/TRG/MTG/SPC/SSPC, resource impacts will primarily involve the participation of one member of the technical or standards committee in MTG.EAS activities and, when appropriate, that member's input to their technical or standards committee regarding MTG.EAS issues in related handbook, program, research, and standards activities.*

MTG.EAS Rationale: ASHRAE has goals of creating technologies and design approaches that enable the construction of net zero energy buildings at low incremental cost, and also of ensuring that the efficiency gains resulting from related R&D will result in substantial reduction in energy use for both new and existing buildings.

HVAC systems are the largest energy consumer in U.S. non-residential buildings, consuming about 40% of the non-residential sector source energy in Year 2003 or about 5.5 quads ($44 billion). Moving air to provide ventilation and space-conditioning may consume about a third to a half of this energy. Clearly, efficient air-handling systems that use as little energy as possible are needed for ASHRAE to achieve its goals.

Although the energy efficiency of many HVAC components in non-residential buildings has improved substantially over the past 20 years (e.g., chillers, air-handler drives), there is still a need to make other equally critical components more efficient (e.g., the air distribution system, which links heating and cooling equipment to occupied spaces). For example, field tests in hundreds of small non-residential buildings and a few large non-residential buildings suggest that system air leakage is widespread and large. It is often 25 to 35% of system airflow in smaller buildings, and can be as large as 10 to 25% in larger buildings. Based on field measurements and simulations by Lawrence Berkeley National Laboratory, it is estimated that system leakage alone can increase HVAC energy consumption by 20 to 30% in small buildings and 10 to 40% in large buildings. Ducts located in unconditioned spaces, excessive flow resistance at duct fittings, poorly configured and improperly sized air-handler fans, unnecessarily high duct-static-pressure set-points, leaky terminal boxes, and inefficient terminal unit fans further reduce system efficiency, and in turn increase HVAC energy consumption even more.

There is no single cause for system deficiencies. One cause is that the HVAC industry is generally unaware of the large performance degradations caused by deficiencies, and consequently the problems historically have received little attention. For example, a common myth is that supply air leaking from a variable-air-volume (VAV) duct system in a ceiling return plenum of a large non-residential building does not matter because the ducts are inside the building. In fact, however, the supply ducts are outside the conditioned space, the leakage short-circuits the air distribution system, supply fan airflow increases to compensate for the undelivered thermal energy, and power to operate the fan increases considerably (power scales with the flow raised to an exponent between two and three depending on system type).

Other causes of the deficiencies include a lack of suitable analytical tools for designers (e.g., VAV systems are common in large non-residential buildings, but most mainstream simulation tools cannot model air leakage from these systems), poor architectural and mechanical design decisions (e.g., ducts with numerous bends are used to serve many zones with incompatible occupancy types), poor installation quality (e.g., duct joints are poorly sealed downstream of terminal boxes and in exhaust systems), and the lack of reliable diagnostic tools and procedures for commissioning (e.g., industry-standard duct leakage test procedures cannot easily be used for ducts downstream of terminal boxes). The highly fragmented nature of the building industry means that progress toward solving these problems is unlikely without leadership from and collaboration within ASHRAE.

Goal, Objectives, and Needs Addressed. Separate opportunities already exist to save 25 to 50% of HVAC system energy (e.g., sealing system leakage, right-sizing ducts and fans, using duct static pressure reset, wireless conversion of CAV systems to VAV). Collectively, facilitation and coordination of industry efforts is needed to better capture

these opportunities and preferably to address system interactions and optimize air-handling system energy efficiency, with the ultimate goal of reducing HVAC-related energy use in buildings.

Therefore, one objective of MTG.EAS is to coordinate the development and assembly of complete packages of tools, technology, and guidelines by individual TC/TG/TRG/MTG/SPC/SSPCs. A second objective is to initiate high-profile demonstrations of the packages to attract the attention of major players, and to transition the packages into the market through public-private partnerships. These efforts should include working with industry partners to update ASHRAE Handbooks and Standards, and to develop education programs for technology implementers so that the design, installation, and commissioning of energy efficient air-handling systems becomes standard practice.

Five areas with particular needs that the MTG.EAS would address are:

1) *Improved Air-Handling System Airflow Diagnostics for Non-Residential Buildings*

Several steps are needed to achieve accurate, cost effective diagnostic tests. One is to evaluate the applicability and reliability of recently developed distribution system leakage diagnostics for use in non-residential buildings and for system configurations that are gaining in popularity (e.g., under floor supply air distribution in larger buildings). A second is to develop reliable, less expensive ways to measure other air-handling system airflows (e.g., for fans). A third is to assess the applicability and acceptance of diagnostic tools and tests as training and quality control aids for the building industry, and a fourth is to initiate commercialization and standardization of these tools and tests.

2) *Improved Air-Handling System Performance Analysis Tools*

ASHRAE Standard 152 calculation methods need to be extended to include non-residential buildings and to address air-handling system efficacy (i.e., thermal comfort) issues. Together with the measurements described below, modeling and analyses of air-handling system impacts on energy use and indoor environmental quality should be carried out to establish baselines for standards and technical targets that are technologically feasible and economically justified over the life of the system, and to verify over time that program targets are being achieved. Standardized procedures for verifying whether targets are met also need to be developed.

3) *Characterize Air-Handling Systems and Assess System Repair in Non-Residential Buildings*

More field data need to be collected about the physical characteristics of air-handling systems in existing buildings, and performance gains that are actually obtained by system improvements need to be demonstrated. Also, research is needed to determine the long-term durability of system sealants. New information about diagnostics and performance should be integrated into improved versions of current system sealing and insulation retrofit manuals for small building owners and HVAC contractors (and into new manuals for use in the large building sector).

4) *Distribution System Guidelines for New and Retrofit Construction*

Even though numerous publications about HVAC system design, testing, and balancing are available or are in preparation, none address the use of appropriate metrics and procedural guidelines for designing and commissioning energy efficient air-handling systems. ASHRAE guidelines about design and installation practices to

avoid problems that occur in current building stock and that are appropriate for use in non-residential buildings need to be developed. Stand alone guidelines for use by building designers, owners, and HVAC contractors describing how to commission air-handling systems also need to be developed.

5) Advanced Technology Applications

New air-handling system technologies that allow life-cycle cost effective reduction in energy use while meeting indoor environmental quality and sustainability requirements for non-residential buildings need to be developed. Aerodynamic improvements are needed to reduce system effects and to make fans and other components less susceptible to loss of efficiency during part load operation. Integration of air-handling, hydronic, and building systems needs further examination. Proof of concept prototypes should be built in collaboration with equipment manufacturers, and then should be tested in the laboratory and in the field to demonstrate performance improvements and to support the development of new performance standards.

MTG Roster:

Requirements below apply to MTG Rosters Only:

* Only one person from each TC/TG/TRG or non-TC group participating in MTG may serve as voting member.
* The Chairs or leaders of participating TC/TG/TRGs or non-TC groups will designate the MTG member to represent their group with a vote on the MTG.
* Alternate Members are nominated by the MTG Chair, and there are no restrictions on the number or affiliations of nominees.
* Alternate Members are expected to participate in MTG activities and attend meetings when possible.
* An Alternate Member normally has no right to vote at the MTG level, but can vote at the MTG subcommittee level.
* An Alternate Member may be given proxy authority, however, by a MTG voting member to vote in his or her absence so that groups participating in the MTG are always represented in a MTG vote.
* The MTG Chair & Vice Chair are not required to be ASHRAE members, but it is preferred.

	Position	Person's Name	TC/TRG or Non-TC Group Affiliation	ASHRAE Member #
1	**Chair:**	*Herman F. Behls*	*TC 5.2*	*0050868*
2	**Vice-Chair:**	*Craig P. Wray*	*TC 4.3, TC 4.7 and Standards Committee*	*2034107*
3	**Voting Member:**		*TC 1.4*	
4			*TC 1.8*	
5			*TC 1.11*	
6			*TC 4.3*	
7			*TC 4.7*	
8			*TC 5.1*	
9			*TC 5.2*	
10			*TC 5.3*	
11			*TC 6.3*	
12			*TC 7.1*	
13			*TC 7.2*	
14			*TC 7.7*	
15			*TC 7.9*	
16			*TC 9.1*	
17			*TRG7*	
18			*SSPC 62.1*	
19			*SSPC 90.1*	
20			*SSPC 189.1*	
Continued				

	Position	Person's Name	TC/TRG or Non-TC Group Affiliation	ASHRAE Member #
21	**Alternate Member:**		*TC 1.4*	
22			*TC 1.8*	
23			*TC 1.11*	
24			*TC 4.3*	
25			*TC 4.7*	
26			*TC 5.1*	
27			*TC 5.2*	
28			*TC 5.3*	
29			*TC 6.3*	
30			*TC 7.1*	
31			*TC7.2*	
32			*TC7.7*	
33			*TC 7.9*	
34			*TC 9.1*	
35			*TRG7*	
36			*SSPC 62.1*	
37			*SSPC 90.1*	
38			*SSPC 189.1*	

T A C U S E O N L Y :

Date Received:_____ Date Sent to TAC/FP:_____ Meeting Date:_____ Approved?
Yes____ No ____