

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

**Technical Committee 4.4
Building Materials and Building Envelope Performance**

**DRAFT Minutes
Monday, June 25, 2016
St. Louis, Missouri**

These DRAFT minutes have not been approved and are not the official, approved record until approved by this committee.

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TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to the individuals listed below within 60 days following the meeting.)

TC/TG/SSPC: TC 4.4

TC Title: Building Materials and Building Envelope Performance

Date of Meeting: Monday, June 25, 2016. Meeting convened at 2:15 pm.

Location: Room 229, America's Center Convention Complex, St. Louis, Missouri

DISTRIBUTION

All members of TC 4.4 plus the following:

TAC Chair

Committee Liaisons

ADDITIONAL DISTRIBUTION

Manager of Standards

Manager of Research and Technical Services

ASHRAE TC 4.4 MINUTES

Monday, June 25, 2016 – St. Louis, Missouri

Building Materials and Building Envelope Performance

1. Introductions/Roll Call/Attendance

The Chair, Peter Adams, called the meeting to order at 2:15pm. Roll call and introductions. A total of 41 committee members, corresponding members and guests were present, one via phone call. A quorum was present (13/18 of voting members). Attendance is shown below:

Voting Members and Officers Present:

<u>Name</u>	<u>Affiliation</u>	<u>Role</u>	<u>VM</u>
Peter Adams	Morrison Hershfield	Chair (Non-Voting)	Voting Member
Richard E Peters	TBS Engineering	Vice Chair	Voting Member
Samuel Glass	USDA Forest Products Laboratory	Research Chair	Voting Member
Fiona Aldous*	WJE	Secretary	Voting Member
Achilles Karagiozis	Owens Corning		Voting Member
Diana Fisler*	Johns Manville	Std. 189.1 Liaison	Voting Member
Manfred Kehrer	Oak Ridge National Laboratory		Voting Member
Stanley D Gatland, II	Saint Gobain	160 SubC Chair	Voting Member
Alexander McGowan*	WSP		Voting Member
Patrick Noonan	Knauf insulation		Voting Member
Fitsum Tariku	British Columbia Institute of Technology		Voting Member
Charles Cottrell	NAIMA		Voting Member
Laverne Dalglish	ABAA	Handbook Chair	Voting Member

Number of voting members present: 13 (0 non-quorum)

Voting Members and Officers Absent

<u>Name</u>	<u>Affiliation</u>	<u>Role</u>	<u>Notes</u>
Theresa A Weston	Dupont	Standards Chair, 90.2	Voting Member
Jan Kosny	Fraunhofer/USA		Voting Member
Hua Ge	Concordia University		Voting Member
Jonathon Humble	American Iron & Steel Institute	90.1 Liaison	Corresponding Member
Paulo Tabares	Colorado School of Mines	Vice Program Chair	Voting Member
Andreas H Holm	Fraunhofer IBP		VM Non quorum
Carsten Rode	Technical University of Denmark		VM Non quorum
Sean M O'Brien	Simpson Gumpertz & Heger Inc	Program Chair	Corresponding Member

* - Voting Members Rolling off July 1, 2016

Corresponding Members Present (13)

<u>Name</u>	<u>Affiliation</u>
Marcus V Bianchi	Owens Corning
Michael Blanford	HUD
Huojun Yang	NDSU
Alejandra Nieto	Roxul
Roderick Jackson	ORNL
Andre Desjarlais	ORNL
Hugo Hens	BWK Klueuven
P. Marc LeFrance	DOE
David Roodvoets	DLR Consultants
John G..Davis	University of Wisconsin
Florian Antretter	Fraunhofer
Michael Salonvaara	Owens Corning
Paul H Shipp	USG Corporation

Visitors Present (15)

<u>Name</u>	<u>Affiliation</u>
Chris Schumacher	RDH
Deborah Callaway	PABCO Gypsum
Nitin Shukla	Fraunhofer
Ratnesh Tiwari	UMD
Charlie Petty	Lamtec
Sam J. Taylor	
Michael Ohadi	UMD
Simon Palin	ORNL
Jay Crandell	ARES Consulting
Anthony Fontanini	
Jonathon Carreiro	Schoeck
Stephan Bangerth	UMD
Gordon Hart	ATREK Engineering
Henry Harvey	Clearesult
Eric Werling	DOE

2. Review of Agenda/Approval of Orlando January 25, 2016 Minutes

The draft minutes from the June 25, 2016 meeting in St. Louis, MO were posted on the TC Google Site in December 2016 and the ASHRAE Website for review. There were a few minor editorial changes. Paul Shipp moved to approve the Orlando minutes as amended. Sam Glass seconded.

VOTE: For 11, Against, Abstaining 2, CNV; MOTION CARRIED

3. Report From the Chair/Membership/Roll-on, Roll-off

Review of Rosters: 20 current voting members.

Four Members rolling off at end of meeting: Diana Fisler, Alex McGowan, and Fiona Aldous. New Voting members: Alejandra Nieto and Wahid Maref.

Provisions for members attending via phone.

ASHRAE Code of Ethics

(Approved by ASHRAE Board of Directors January 30, 2013)

1.140.001.1 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.

- A. Efforts of the Society, its members, and its bodies shall be directed at all times to enhancing the public health, safety and welfare.
- B. Members and organized bodies of the Society shall be good stewards of the world's resources including energy, natural, human and financial resources.
- C. Our products and services shall be offered only in areas where our competence and expertise can satisfy the public need.
- D. We shall act with care and competence in all activities, using and developing up-to-date knowledge and skills.
- E. We shall avoid real or perceived conflicts of interest whenever possible, and disclose them to affected parties when they do exist.
- F. The confidentiality of business affairs, proprietary information, intellectual property, procedures, and restricted Society discussions and materials shall be respected.
- G. Each member is expected and encouraged to be committed to the code of ethics of his or her own professional or trade association in their nation and area of work.
- H. Activities crossing national and cultural boundaries shall respect the ethical codes of the seat of the principal activity.

Peter Adams attended the chairs breakfast on Sunday morning:

- Roster committee members. Download from my ASHRAE page. Review of current voting members. Four members rolling off. A new roster online tool will be available for the next meeting 2017.
- New TC website format. ASHRAE requested new or recent visitors to comment on new format.
- New method of procedure document: "Method of Procedure". Please read this document.
- TC4.4 has been using Google sites, which ASHRAE has stated will need to stop. ASHRAE will use Basecamp in future. Alejandra to review. ASHRAE will pay Basecamp annual fee, however ASHRAE retains ownership of the documents, & will hopefully improve collaboration.
- RPM – Remote Participation Meeting (retiring ENP). Will allow people to attend the meeting remotely, and can vote. Mike Vaughn is contact for this RPM. Feedback has been positive.
- ASHRAE also offers remote meetings. Able to set up web meetings. Encouraging sub-committee meetings to meet outside of the current format, to meet between the two meetings.
- State of Indiana has almost voted away the need for professional engineering licenses. Review state regulations, several states are looking at removing licensure for practice of engineering. Keep an eye on regulations in your local state.
- CTCC – members may receive a phone call to promote the TC.
- Potential new TC members can click on the "JOIN A TC" button at the top of the TC page (www.ashrae.org/tcs) on the ASHRAE website to get started.

Upcoming Workshops and Conferences: 2016

Second International Conference on Energy and Indoor Environment for Hot Climates, Doha, Qatar
February 26 - 27, 2017

Delivering Resilient High-Performance Buildings, Loughborough, UK April 5-6, 2017

ASHRAE 2017 Building Performance Analysis Conference, Atlanta, GA, September 27 - 29, 2017

Upcoming meetings:

Las Vegas 2017 - Tracks and dates are given in the Program Subcommittee Report.

Comments Related to Handbook

- Dr Bass introduced review comments on the chapters performed by Professor Michael Ohadi from University of Maryland. Chapters 25, 26 and 27 were reviewed. Can committee review the edits in time to submit to ASHRAE Handbook Committee? Can an extension be negotiated?
- Comments from Professor Ohadi:
 - Chapter 25 - looks good, a few typos, and questions
 - Chapter 26 & 27. Mistakes in properties that need to be corrected.
 - Two examples added to Chapter 27. Not clear to students.

Report from Liaison to TC 4,4 - Dennis Wessler

- The CTTC - Chapters Transfer Technology Committee and TC 1.7. Have a power-point presentation on ethics. Available for CEUs.
- Roster changes to be done online. Software is done. Beta testing underway. Remote access by members. Mike Vaughn at ASHRAE HQ to obtain remote meeting laptop, projector, etc
- Can go to ASHRAE TC roster from website. At "My Membership", committees, will identify the new members. Encouraged cleaning up the roster, and getting rid of non-interested corresponding members.
- New TC websites are available, and easy to use and update. A webinar is available online and roster updates.
- Can do sub-committee meetings ahead of meeting to reduce time at conference spent in the meetings at conference. CEC can be contacted to schedule the meeting.

4. Research Subcommittee

Update provided by Samuel Glass, Research Subcommittee Chair.

Abbreviations

MORTS = Manager of Research and Technical Services RP = Research Project

PES = Proposal Evaluation Subcommittee

RTAR = Research Topic Acceptance Request

PMS = Project Monitoring Subcommittee

TRP = Tentative Research Project

RAC = Research Administration Committee

URP = Unsolicited Research Proposal

RFP = Request for Proposals

WS = Work Statement

RL = Research Liaison

News

Section 4 RL is Xudong Yang from Tsinghua University.

RTAR and WS forms (latest revisions dated 6/2015) are available at <https://www.ashrae.org/standards-research-technology/research> (near bottom of page under “Information for TCs/TGs/MTGs Sponsoring Research”).

Information conveyed at Research Subcommittee Chairs’ breakfast:

- “RAC to look into more applied research”; “Evaluate the concept of allocating Research funds for post project processing that will produce tools, presentations, etc....”
- Changes to URP process to be posted after St. Louis.
- Updated research manual to be posted after St. Louis; specific changes deal with new milestones for PMS and other changes.
- New WS template has milestone chart and associated costs for each milestone as a percentage of total project cost. Criteria will allow PMS to exercise better control over payment approval. Training material is being reviewed for posting on the ASHRAE website.
- Research database now online: 250 projects with more to follow.
- Current meeting: RAC evaluated 9 RTARs (1 accepted, 4 conditionally accepted with comments, 4 rejected); 10 WSs (6 conditionally accepted, 4 returned).
- Noted that all co-sponsoring TCs should be providing input to the development of the RTAR and WS.

Research topic brainstorming session was held at subcommittee meeting in Atlanta 2015-6-28, led by Theresa Weston. Topics have been compiled.

Action item: Glass will send list of topics to TC members by e-mail first to add any further topics and clarify existing topics. Glass will then revise the list and send to TC members to rate their top 5 topics.

Project Status Updates

1696-RP

Thermal, Moisture and Air Transport Property Values for New Building and Insulating Materials (Authors: Alex McGowan, Steve Cornick). PMS includes Alex McGowan (chair), Sam Glass, Achilles Karagiozis, and Theresa Weston. Three-year project (Sep. 1, 2015 – Aug. 31, 2018). Contractor is RDH Building Science Labs. PMS met 2016-6-26. Properties to be measured include thermal conductivity, specific heat, density, air permeance, water vapor permeance, liquid diffusivity, moisture storage function, saturation moisture content, solar absorptance, and thermal emittance. Chris Schumacher presented progress on Task 1 (identify and characterize new materials) and Task 2 (identify changed materials). Presented proposed structure of final reports to facilitate more meaningful discussion with PMS, improve the level of documentation, and compress time required to complete reporting phase. Discussed applicable sampling standards for different materials. Discussed test methodology and documentation of any departures from standard methodology. Contractor expects to have 90% of

materials sourced by end of August. Does not anticipate problems with project timeline or budget. PMS would like to have more frequent communication with contractor.

1718-WS

Development of a Method to Determine the Moisture Transport Properties of a Roof Shingle System under Real Conditions (Author: Manfred Kehrner; cosponsored by TC 1.12 and SSPC 160). TC voted to accept RTAR 2014-1-20 after revisions in response to RAC comments. RAC voted to accept with conditions (improve grammar, clarify approach and deliverables, and get co-funding). TC voted to accept WS by letter ballot 2015-8-14. Notification letter from MORTS 2015-11-20: RAC reviewed the subject WS and voted 3-0-0 CNV to return with comments. Main issues and concerns to be addressed:

1. RTAR acceptance letter asked TC to identify potential co-funding. Cover sheet does not list any.
2. Author's institution is the only listed bidder. A list of bidders must be supplied.
3. Work statement should cover ASTM E96 and how it relates to this project.
4. Barely a majority of the TC in favor.
5. Need to provide more guidance on the test method for task 2.

WS on hold until co-funding can be identified. If co-funding cannot be secured, efforts should be documented in response to RAC comments when WS is resubmitted.

1730-WS

Research to Determine the Pressure Coefficients and Pressure Drop for Standard Venting Strategies and Components in Attic Spaces with Sloped Roofs (Authors: Anthony Fontanini, Dave Roodvoets; cosponsored by TCs 4.3, 4.5, and 4.7). TC voted to accept RTAR by letter ballot 2014-5-14. RAC voted to accept with conditions. Work statement should be submitted to RAC by 2018-7-1 or will be dropped permanently. Discussion in research subcommittee meeting 2015-1-25 identified volunteers for task group to provide input to draft WS: Stan Gatland, Fitsum Tariku, Marcus Bianchi, and Peter Adams. Bill Rose mentioned zonal pressure/airflow measurements of attics in weatherization work and will make a report available to the TC. On hold while Fontanini completes PhD dissertation.

1759-WS

Impact of Air-Flow on Thermal Performance of Airspaces behind Cladding (Phase 1 of 2) (Authors: Jay Crandell, David Yarbrough, Jonathan Humble; SSPC 90.1 envelope subcommittee). SSPC 90.1 approached TC 4.4 with request for TC 4.4 to sponsor RTAR and SSPC 90.1 to cosponsor. RL recommended splitting project into two phases. TC voted by letter ballot on RTAR for phase 1, 2015-2-12. Notification letter 2015-7-29: RAC voted to accept it for further development into a WS. First draft of WS should be submitted to RAC no later than May 15, 2017. Draft WS and response to RAC comments distributed to TC January 2016 and discussed in research subcommittee in Orlando. Revised and discussed in research subcommittee in St. Louis 2016-6-26; straw poll recommended voting to approve at main committee meeting.

Motion: Glass moved to accept the WS and forward to RAC; Paul Shipp seconded. Vote: 12 for, 0 against, 0 abstaining, chair not voting.

Draft RTAR

Develop Performance Metric, and a Process for the Measurement, Evaluation and Prediction of Speech Privacy in High Performance Buildings (Author: Kenneth Roy, TC 2.6). Paul Shipp introduced RTAR at research subcommittee in St. Louis 2016-6-26 and suggested that TC 4.4 co-sponsor. RTAR was distributed to TC 4.4 members.

Motion: Shipp moved to co-sponsor; Laverne Dalglish seconded. Vote: 11 for, 0 against, 1 abstaining, chair not voting.

Draft RTAR

Evaluating the Accuracy of Whole Building Energy Simulations by Comparison with Field Measurement Data (Author: Sean O'Brien). Discussed at research subcommittee 2014-1-19. Will be revised and posted on Google site for comments. Also seeking input from TC 4.7. No further action.

Draft RTAR

Hygrothermal Properties of Aged Construction Materials (Author: Steve Cornick). Discussed at research subcommittee 2014-1-19. No further action.

Draft RTAR

Moisture Transfer in Building Materials at High Temperatures (Author: Sam Glass). Discussed at research subcommittee 2014-1-19. No further action.

5. Handbook Subcommittee

Update provided by Laverne Dalglish, Handbook Subcommittee Chair

For Handbook related items go to the following website:

<https://www.ashrae.org/resources--publications/ashrae-handbook-central>

Handbook Training Report:

- ASHRAE developed collaborative site for Handbook revisions, and not Google docs. The document is visible in word. All changes to be saved in track changes, and others working on the document simultaneously, all changes will be visible. If access needed if not VM of 4.4, can obtain access.
- ASHRAE encourages work on chapters before the due date.
- ASHRAE aware that many countries review the Handbook, and it's important to maintain the quality and accuracy of the Handbooks.
- Need to begin to review tables and testing. Laverne will propose some changes. For example, Table 1. Need to discuss assumptions that testing was performed per ASTM or ISO documents.

Handbook – Fundamentals revisions:

- Chapter 25 – Marcus Bianchi
- Chapter 26 – Alex McGowan
- Chapter 27 – Charles Cottrell

- Chapter 44 – Peter J. Adams
- At the end of revisions to each Chapter.
- Additional information presented earlier in the meeting. Laverne requested committee decide if new material to be reviewed. Short time line in front of the committee to address this new information in the next few weeks.
- As of June 24, 2016, Chapter 27 was unchanged. Chapter 26 to be updated, and finalized in preparation for a letter ballot. Chapter 25 to be updated with a minor material reference.
- Need to begin working on Chapter 44.
- Peter Adams - Chapter 25, 26 and 27 to be letter balloted as each of the documents become available. In the email preamble, it needs to be emphasized that time is of the essence.
- Sam Glass noted that prior changes to Chapter 26, Table 6, were approved by the TC in August 2012 but did not make it into the 2013 printed version."
- Voting members rolling off the committee will not vote on the changes.
- The production schedule for the 2017 HOF (attached) can be found on the TC Google site. <https://sites.google.com/site/ashraetc44/home/handbook-page>

6. Program Subcommittee

Update was presented by Peter Adams. The Program Subcommittee Chair Sean O'Brien was not present. Sub-Chair Paulo Tabares not present.

- Paulo Tabares is to take over the role of Program Chair.
- Peter Adams outlined upcoming conferences:
 - Clearwater FL conference, Dec 5-8, 2016. Monday morning committee 9am-12pm. Marriott.
- No Program in Orlando. No program in St. Louis. Two were submitted, neither were accepted.
- Peter and Paulo to discuss with Track Chairs to see what is of interest.
 - Rick Peters proposed TC4.4 may be able to develop own track. Two more ways to present: 1. Debate and, 2. Panel Discussion. In addition to workshops as a method of presentations. Workshops are 90 minutes.
 - Theresa Weston suggested focus on international experience and residential. Winter meetings have larger international attendance due to HVAC show.
 - TC committee could sponsor a conference paper submission
 - Peter to distribute tracks for future conferences.
 - Peter & Paulo to hold a brainstorming session on Program.
- Upcoming ASHRAE meetings:
 - Winter 2017 meeting in Las Vegas, Jan 28-Feb 1, 2017
 - Summer 2017 meeting Long Beach, CA. Long Beach has some Tracks including the "Envelope"

CEC's Standing Request for Future Society Meeting Program Track Suggestions

The Conferences and Expositions Committee (CEC) oversees ASHRAE's annual and winter conferences and other specialty conferences and expositions globally. The CEC continually works to improve the conference experience for all attendees.

Please submit your suggestions to ASHRAE Staff member Tony Giometti (Giometti@ashrae.org). You can also add your track suggestion in the “Comment” section of the TC Activity form.

CEC Always Seeks TC Volunteers willing to Support Content Development and Quality Control for Society Technical Program at Society Meetings

Provide to your Section Head after each Society meeting a list of qualified volunteers from your TC that are potential Technical Session chairs and reviewers of session papers that are related to TC’s scope for use by the Conferences & Expositions Committee (CEC) in developing technical content for future technical programs.

7. Standards Subcommittee

Updates were presented by Liaisons to the subcommittees on the behalf of the Standards Subcommittee Chair, Theresa Weston.

Std.90.1: (Jonathan Humble Liaison absent. Charles Cottrell provided update) Committee is working on a plan for next edition, final addenda for 2016 for roofing, etc. Trying to organize in a more useful manner. Addressing thermal bridging issues in upcoming version. Looking to develop a framework for addressing the major thermal bridge issues, not just the ones at studs in the field of the wall. Borrowing some equation from Handbook, so if designers want to use a different thermal bridging approach the equation can substitute for this. Changes from 2013 include fenestration, however no major changes for opaque envelopes. The compression of insulation in metal buildings has evolved into compression of all insulations. For example, How is this dealt with, ie. Tables with compressed R values. Air barriers trying to redefine terms. Roof can be an exposed air barrier, ie. 90.1 changed to include “single ply” roof membrane will be released in 2016 version. Envelope sub-committee working on 2019 version.

Std. 90.2: (Theresa Weston Liaison) • 90.2, to be transformed into a performance based standard, with a public review draft out by end of 2016. Terry is in charge of this.

Std. 160: (Stan Gatland Liaison) Addendum on mold criteria went out for public review. Revised criteria based on mold growth index developed in Finland. Received late comment from American Chemistry Council. Will vote to publish addendum, then address comment with a new addendum.

Achilles Karagiozis discussed going to RC with RTAR on moisture generated loads. Loads in 160 appear to be high, and would like to work with TC4.4.SPC 160 and TC1.12 to develop information on interior generated loads. Will be a request from RAC to TC. Marc LaFrance stated the group is more interested in average loads than peak loads. Achilles is POC for this committee.

Std. 169: (Steve Cornick Liaison). No update

Std. 189.1: (Diane Fisler Liaison) Addendum i reorganizes the roof heat island mitigation section and adds new provisions for vegetated terrace and roofing systems relative to plant selection, growing medium, roof membrane protection, and clearances. In addition, provisions for the operation and maintenance of vegetated roofs have been added to Section 10.

Addendum k proposes change to 189.1 for harmonization with the 2015 International Green Construction Code (IgCC). The change from 10 % to 5 % in the U-, C- and F- factors and in the SHGC is based on it being more practical to design and build, while having only a limited impact on energy use. The proposed change also adds skylights to the requirements for fenestration SHGC and U-factors to implement a more consistent technical approach to the issue. In addition, the SHGC for fenestration is proposed to be reduced in Climate Zones 1-3 in addition to Climate Zones 4-8, which were already included. This change reflects the fact that a 5 % reduction is not very difficult to achieve and need not be restricted by climate zone.

GPC34P “Energy Guideline for Historical Buildings and Structures”: (Bill Rose) No update.

MTG.DB “Building Dampness”: (Rick Peters) A new sub-task group has been developed to define and provide a description of damp buildings.

8. Old Business

Nothing to report.

9. New Business

Sam Taylor:

Introduced advisory group to faculty and students on “Race To Zero”. Trying to develop a hygrothermal simulation development guide. Has established a conference call as a scoping study. Looking for help from members who will can help students. “Race To Zero” available Nov 1, including 14 hour module on Building Science Fundamentals.

Hugo Hens:

1. Consider new Chapter on moisture loads in buildings
2. 7th IBPC, building physics conference, international association of building physics, Syracuse, NY. Sept 23-26, 2018. Covers all aspects of building envelope physics, including lighting acoustics, etc.
3. Hugo has published a new book.

Paul Shipp:

Would like to become liaison for TC 2.6 for TC 4.4.

10. Adjournment

Peter Adams moved to adjourn the meeting at 15:35; Paul Shipp seconded.

Fiona Aldous – Secretary, TC 4.4. Next meeting Las Vegas NV, January 30th, 2017