

**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**

**Minutes**

**January 23, 2012**

***These minutes were approved by this Committee on June 25, 2012.***

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.**

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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, January 23, 2012. Meeting convened at 2:15 pm.**  
**Location: Spire Room, Hilton Palmer House, Chicago, IL.**

**DISTRIBUTION**

All members of TC 4.4 plus the following:

TAC Chair

Committee Liaisons

**ADDITIONAL DISTRIBUTION**

Manager of Standards

Manager of Technical Services and Research

**ASHRAE TC 4.4 MINUTES**

**Chicago, IL, USA**

**January 23, 2012**

**Technical Committee 4.4**

**Building Materials and Building Envelope Performance**

**1. Introduction and Attendance**

The Chair, Garth Hall, called the meeting to order at 2:15 pm with 32 members and guests present. A quorum was present.

**Voting Members and Officers Present:**

<b><u>Name</u></b>	<b><u>Affiliation</u></b>	<b><u>Role</u></b>	<b><u>Notes</u></b>
Garth Hall	Raths, Raths & Johnson, Inc.	Chair	
Marcus Bianchi	NREL	Vice-Chair	Non-voting
Peter Adams	Morrison Hershfield Ltd.	Secretary	
Therese Stovall	ORNL	Handbook	
Sam Glass	USDA Forest Products Lab	Research	
Steve Cornick	NRC/IRC	Website	
Sean OBrien	Simpson Gumpertz & Heger, Inc.	Program	
Hugo Hens	K.U. Leuven		Non-quorum
Hartwig Kunzel	Fraunhofer Institut Bauphysik		Non-quorum
Anton TenWolde			
Holly Bailey	Bailey Engineering Corporation		
Achilles Karagiozis	Owens-Corning		

**Number of voting members present: 9 (2 non-quorum)**

**Voting Members and Officers Absent**

<b><u>Name</u></b>	<b><u>Affiliation</u></b>	<b><u>Role</u></b>	<b><u>Notes</u></b>
Theresa Weston	DuPont	Standards	
Larry Elkin	Applied Building Sciences	ALI/Honors & Awards	
Stan Gatland	CertainTeed Corporation		
Mikael Salonvaara	Huber Engineered Woods LLC		

## Corresponding Members Present

<u>Name</u>	<u>Affiliation</u>
Charles Cottrell	NAIMA
Chris Crall	CCrall Consulting
Diana Fisler	Johns Manville
William Rose	Univ of Illinois at Urbana-Champaign
Pat Noonan	Knauf Insulation
Andre Desjarlais	ORNL
Fiona Aldous	WJE
Wahid Maref	National Research Council Canada
Wei Lam	WJE
David Roodvoets	DLR Consultants
Paul Shipp	USG Corporation

## Visitors Present

<u>Name</u>	<u>Affiliation</u>
Kurt Roth	Fraunhofer CSE
Ricardo Gamboa	IIG
Fitsum Tariku	BCIT
Ayman Youssef	Saudi ARAMCO
Brent Stephens	U of Texas - Austin

## 2. Approval on Montreal Minutes

The minutes from the June 27, 2011 meeting in Montreal had been posted on the Google site and ASHRAE site for review.

### Motion 1

Anton TenWolde moved for the approval of the Montreal Minutes			<b>SECOND:</b> Bill Rose
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Notes:</b> Chair not voting

**DISCUSSION:** None

**Motion Caries**

## 3. Report From the Chair

Chair, Garth Hall, made some general announcements.

- a. There will be changes to the fee structure for meeting registration. Speakers will pay 25% of registration fee. This policy will be in place for San Antonio.

- b. Roster Update: Mika has been removed from the roster as a voting member to prevent a duplicate membership at Owens Corning due to his employment change. Adding Fiona Aldous, Diana Fidler, and Alex McGowan beginning in July 2012.
- c. Charles Cottrell requested that he be added as a voting member of TC4.4 during next rotation. Corresponding members are encouraged to request to be added. The TC historically has good participation so good opportunity to accommodate these requests.
- d. Informally, we were informed at Chair information session that, over the last 8 meetings, TC4.4 was in the top 20 of 100 TC for delivering program sessions. Discussed possibility of getting session into San Antonio. February 13 is deadline for submittals.

## 4. Research Subcommittee

Research Subcommittee chair: Sam Glass.

### General

Attended the research subcommittee chair breakfast. Highlights:

- New Research Liaison for Section 4 is Srinivas Garimella ([RL4@ashrae.net](mailto:RL4@ashrae.net))
- Dru Crawley was awarded the "Service to ASHRAE Research Award" (nominated by TC 4.2)
- New funding opportunity: GPIC-HUB. (Greater Philadelphia Innovation Cluster, part of U.S. DOE's hub for energy efficient buildings). Opportunity Research Fund (ORF) provides co-funding through grants of between \$100,000 and \$250,000 to support research, development, demonstration, and deployment of technologies, policies, business models, and training programs that advance GPIC goals. RFPs coming in spring and summer 2012. Focus on retrofit of average size commercial, multi-unit residential, and mixed (com and multi-unit res) buildings. Further information: [gpichub.org](http://gpichub.org)
- 10 TRPs released for bid in Fall 2011
- 5 Work Statements approved, ready for bid in Spring 2012 provided sufficient funding available
- TCs encouraged to produce more projects; current number of RTARs (6) and Ws (2) for RAC to evaluate is quite low
- New RTAR cover sheet coming

### Recently-Completed Research

1365-RP: Thermal Performance of Building Envelope Details for Mid- and High-Rise Buildings

- Contractor: Morrison Hershfield; Mark Lawton, Patrick Roppel
- PMS: [Marcus Bianchi](#), Alex McGowan, Anton TenWolde, Rick Peters
- TC 4.4 approved final report at Montreal meeting
- Final report is available on [ashrae.org](http://ashrae.org)

- Special thanks to Marcus for a great job as PMS Chair.

## Future Research

Work Statement 1561-WS, “Procedures to Adjust Observed Climatic Data for Regional or Mesoscale Climatic Variations”

- Original RTAR title/author: Characterization of Climate Conditions in Near Ocean Environments/Larry Elkin
- Committee decided that TC4.2 should take the lead
- RTAR rewritten by Steve Cornick, TC 4.4’s liaison with 4.2
- RTAR submitted by TC 4.2 and approved by RAC
- WS written, submitted to RAC; returned with comments; resubmitted
- TC 4.4 voted to cosponsor at Montreal meeting
- During their fall meeting, RAC voted to accept this WS for bid
- Highly probable that it will go out for bid Spring 2012
- Künzel volunteered to represent TC 4.4 on the Proposal Evaluation Subcommittee

New RTAR: Research to Determine Energy and Moisture Impacts of Attic Ventilation

- Author: Dave Roodvoets
- Posted on Google site 2012-1-20
- Discussed at research subcommittee meeting; needs clarification of scope, but topic is supported and scope can be clarified when work statement is written
- Straw vote was held during subcommittee meeting and it recommended moving RTAR forward to RAC

## Motion 2

Hartwig Künzel moved to send the RTAR under this discussion to RAC subject to editorial changes by Research Liaison.			<b>SECOND:</b> Steve Cornick
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting

- **DISCUSSION:** *Steve Cornick expressed concern that the RTAR was too vague to send. What codes does it consider? What insulation? Not a WS yet, but detail level might be OK for RAC. Option are to wait until next time when it will be more developed, or submit now and see what comes back. Topic is valid and all agreed that we would move forward*

*Comment from Research Liaison (Srinivas Garimella): the clearer and more specific you can make the RTAR, the better the chances for acceptance. Likely will be returned if too vague. RAC*

*will assess the budget based on the nature of the work. Holly suggested submitting then work on the WS while we wait. Bill Rose suggested breaking the work into parts. The current RTAR might generate more than 1 WS. There was a general discussion on the relevance of research.*

**Motion Caries**

- Task group will develop work statement in the meantime; group includes David Roodvoets, Andre Desjarlais, Holly Bailey, Bill Rose, Anton TenWolde, Achilles Karagiozis, Sam Glass

RTAR 1621 was rejected.

New RTAR: Updating the Thermal and Moisture Transport Property Values for Common Building and Insulating Materials

- Authors: Steve Cornick and Alex McGowan
- Posted on Google site; updated 2012-1-9
- TC recommended at Montreal meeting to combine two previous RTARs: "Updating Thermal Property Values in the Handbook of Fundamentals" (McGowan) and "A Thermal and Moisture Transport Property Database for Common Building and Insulating Materials: Update of RP 1018" (Cornick)
- Discussed at research subcommittee meeting
- Action item: send comments to Steve Cornick and Alex McGowan by March 1, 2012

RTAR: Hygrothermal Properties of Aged (in situ) Construction Materials

- Author: Steve Cornick
- Posted on Google site; updated 2012-1-9
- Discussed at research subcommittee meeting
- Action item: send comments to Steve Cornick by March 1, 2012

RTAR (TC 4.2): Moisture Design Reference Years for Hygrothermal Analysis and Design of Buildings: 1325-RP Update

- Author: Steve Cornick; TC 4.2 taking the lead, looking for TC 4.4 to co-sponsor

- Posted on Google site; updated 2011-12-9
- Action item: send comments to Steve by March 1, 2012

RTAR (TC 1.8): Testing the Water Vapor Transfer of Materials and Systems Used in Chilled Water Mechanical Insulation Systems

- Author: Gordon Hart; TC 1.8 taking the lead, looking for TC 4.4 to co-sponsor
- Posted on Google site 2011-6-13
- Being rewritten by TC 1.8; stay tuned

RTAR: Evaluating the Accuracy of Whole Building Energy Simulations by Comparison with Field Measurement Data

- Author: Sean O'Brien
- Working with TC 4.7 and others to further define the scope of this project.

RTAR: Investigation of the Long-Term Performance of Sheathing Membranes due to the Effects of Surfactants, Chemicals, and Aging

- Author: Garth Hall
- Draft has been circulated; received comments from liaison
- Co-sponsored by TC 1.12
- RTAR needs to be revised to include more information on existing methodologies and other references
- Will be revised by Garth Hall and Theresa Weston

## 5. Handbook Subcommittee

Handbook Subcommittee Chair: Therese Stovall

### Applications Handbook Liaison

The Handbook Liaison for Applications Chapter 44, George Sestak, attended and provided the following:

- Should be considering adding some "pizazz" the electronic versions of the chapters

- Need to complete a reference check for the Handbooks. Some of them are more than 30 years old and should be either reaffirmed or replaced with newer if appropriate.

### Chapters for Future Revision

Applications Chapter 44: Peter Adams will be starting the review process within the near future. A copy of the current chapter will be posted on the Google site for review prior to San Antonio.

### Chapters Currently Under Revision

Fundamentals chapters 25 and 26 were posted to the TC 4.4 Google site for review on January 10, 2012. Chapter 27 was posted for review January 13, 2013. The due dates for final submittal for the next Fundamentals volume are:

- April 5 – Chapter 25 due to Handbook Liaison
- April 26 – Chapter 26 due to Handbook Liaison
- May 17 - Chapter 27 due to Handbook Liaison

### Acceptance of Majority of Chapter Content

Comments were received from Bill Goss, Paul Bertram, Hugo Hens, and Charles Cottrell. Those comments were discussed at the meeting, along with other issues brought up by attendees.

By general consensus, the subcommittee agreed these chapters were ready to bring to the main committee for ballot. There were two areas where a future letter ballot may be required. Voting was held to accept the majority of the Chapter contents, with some of the controversial content to be voted on later. For the information of committee members not attending the subcommittee meeting, those areas changed from the posted versions and accepted wholly by the subcommittee include:

- Chapter 25
  - new solar driving force section from Teresa Weston.
  - wording change in definition of heat flux (Hugo comment).

### Motion 3

Therese Stovall moved to accept the `non-controversial` content of posted version of Chapter 25			<b>SECOND:</b> Steve Cornick
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting

- **DISCUSSION:** None  
**Motion Caries**

- Chapter 26

- add 5.5 inch air spaces to Table x using values generated by Dave Yarbrough as previously reviewed.

#### Motion 4

Therese Stovall moved to accept the `non-controversial` content of posted version of Chapter 26			<b>SECOND:</b> Paul Shipp
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting

- **DISCUSSION:** Editorial comments from Hugo  
**Motion Caries**
- Chapter 27
  - Bill Goss comment that we explain that a reasonable assembly thermal U-factor can be based up on the average of the parallel path and isothermal planes.
  - Corrected example 13, as identified by user.
  - Editorial comments from Hugo

#### Motion 5

Therese Stovall moved to accept the `non-controversial` content of posted version of Chapter 27			<b>SECOND:</b> Anton TenWolde
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting

- **DISCUSSION:** Hugo expressed his concerns with some of the examples.  
**Motion Caries**

#### Additional Chapter Content to be Voted On

The following areas require discussion at the main committee level and/or letter ballots.

- Chapter 25
  - Airflow description. New text for estimating air leakage was discussed, as well as the need to simplify the approach.
  - Wind washing is a defined term. Andre feels it inappropriate to use air movement to change wall R-value and we should be careful about simply catering to the perceived needs of those outside the Committee by putting this in the handbook.
  - Discussion about effective resistance using R-value and air leakage is included in the Handbook already. Perhaps increased discussion in the text. Discussion

regarding whether equations governing the effects of air leakage on thermal performance should be added.

- Discussion about having web meeting and letter ballot.
- Decision to use the version of the airflow section posted on Google site with the equations portion replaced with one or two empirical examples that demonstrate the importance of good workmanship. Hartwig and Therese will revise this section and submit it to the committee for a letter ballot.
- Chapter 26
  - Some product performance data is old. Discussion on the use of manufacturer-supplied property data, based on their results from independent testing from approved labs.
  - Read Alex response - He stated that 98% is from independent sources, or unique resources. He volunteered to participate in a sub-committee to deal with the table.
  - Bill Rose asked how manufactures could participate in the development of the table. Charles stated that data prepared by accredited lab would be expensive, and not likely to happen if we required 3<sup>rd</sup> party for everything.
  - Discussed that TC4.4 would review all data provided and decide what was acceptable – the data would be vetted. Footnotes could be used to augment table data and ranges could be provided.
  - Possible establishment of a data archive on the Google web site
  - Decided that the task group consisting of David Roodvoets, Alex McGowan, David Yarbrough, Therese Stovall, Charles Cottrell, and Marcus Bianchi will review the data submitted by NAIMA. The results of that review are anticipated to lead to a letter ballot that would contain a revision to the pertinent table. A web meeting of the task group will take place before the middle of February.
- Chapter 27
  - Nomenclature/symbols and consistency of same with Chapter 25.
  - At the main committee meeting Bill Rose presented a handout describing revised nomenclature version based on the discussion at the subcommittee meeting.
  - Andre Desjarlais requested two revisions to the handout text be made - C instead of U in the system level, and ‘transmittance’ instead of ‘conductance’ in the assembly level

## Motion 6

Therese Stovall moved that proposed changes suggested by Andre are made and that we accept Chapter 27 as revised.	<b>SECOND:</b> Steve Cornick
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<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting
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- **DISCUSSION:** None  
**Motion Caries** – No letter ballot required.

### Future Work on Handbook of Fundamentals

These areas will be addressed in the future.

- Chapter 25
  - Transient hygrothermal modeling – revise last section regarding the use/interpretation of model output.
- Chapter 26
  - Description and property ranges for ‘green’ materials, such as bio-based foams or ground-up blue jeans per Hugo suggestion
  - Discuss inclusion of aged values
- Chapter 27
  - Add an example comparing the Glaser and transient moisture analyses.
  - Possible inclusion of SIPs, ICFs, and other pre-engineered insulated systems per Bertram’s suggestion
  - Formalize a procedure for incorporating data from manufacturers?

### Acknowledgement

Many thanks to Hartwig Kuenzel, Alex McGowan, and Bill Rose for their work revising these three chapters.

## 6. Program Subcommittee

Program Subcommittee Chair: Sean O’Brien.

### Current Programs

TC 4.4 programs this conference: NONE

### General

- At the last meeting we discussed a day-long seminar entitled “What Mechanical Engineers Must Know About Building Envelopes for High Performance Buildings”. The last action was Sean’s review and commentary on the outline that Hugo developed (returned to the discussion team on 25 April 2011). Members of the discussion were:
  - Sean O’Brien
  - Hugo Hens
  - Holly Bailey
  - Peter Adams
  - Bill Rose

- Anton TenWolde
- Alex McGowan
- Sean confirmed that people are still interested and will re-send the latest outline to that group for comments. I will also discuss a “preview” seminar with TC 1.12 for San Antonio or Dallas to generate interest in the day-long session.
- This is the first conference in a long time where we did not have any programs sponsored or co-sponsored. Although we have apparently been in the top 20 (out of ~100) tech committees as far as program generation, I would like everyone to make a push to get ideas out there for the next two meetings – info/tracks listed below. For San Antonio we only have time for seminars and forums (due Feb 13) but for Dallas we have time for conference papers (due March 19).
  - Sean requested we review the tracks below and send him any ideas you may have. Should aim for something related to energy conservation in both conferences (it is an actual track in Dallas), maybe more on the modeling side for San Antonio to meet the track ideas. Sean happy to discuss ideas people may have, but feel it is important to push on this and make sure we get at least one or two programs into the next conference. Sean will try to send out some brainstorming ideas to generate new topics, or at least a running list of potential topics for programs (similar to the brainstorming session for research a few years ago).
- Any ideas for co-sponsored programs are also welcome. For something like an energy modeling talk it would be good to include TC 4.7. Possibly a seminar for San Antonio?
  - Sean asked about commissioning of the building envelope – how do you do it. Can we present on it? Fiona doing a seminar for 7.9 on envelope commissioning. Rick stated there was a need for tools to use during building envelope commissioning.
- Sean will discuss with Mark Lawton a resubmittal of the seminar on RP 1365 findings. There is no clear reason why this was not accepted for Chicago, especially considering ASHRAE paid for the research.

## Future Programs

(Posted to the Google Meeting Minute Page or can be found [here.](#))

- NEXT CONFERENCE

San Antonio TX Conference

June 23-27, 2012

**Track 1** HVAC&R Systems & Equipment

**Track 2** HVAC&R Fundamentals and Applications

**Track 3** Integrated Energy Systems

**Track 4** Building Modeling Applications

**Track 5** Refrigeration Applications

**Track 6** Indoor Environmental Applications

**Track 7** Integrated Building Controls

Seminar / Forum / TPS & CPS Proposals due **FEB 13, 2012**

Final papers due by **MARCH 7, 2012**

Submit online at: [www.ashrae.org/SanAntonio](http://www.ashrae.org/SanAntonio)

- FUTURE CONFERENCE

Dallas TX Conference

Jan 26-30, 2013

**Track 1** HVAC&R Systems & Equipment

**Track 2** HVAC&R Fundamentals and Applications

**Track 3** Standards, Guidelines, and Codes

**Track 4** Energy Conservation

**Track 5** Refrigeration

**Track 6** Large Building Design

**Track 7** Facility Management; Operations, Technology and Energy Improvements

**Track 8** Special Interest Track

Conference paper abstracts and conference paper session proposals due MARCH 19, 2012.

Submit online at: <http://ashrae.org/Dallas> after January 22, 2012

- OTHER CONFERENCES

ASHRAE High Performance Buildings Conference – March 12-13, San Diego

- [www.ashrae.org/HPBConference](http://www.ashrae.org/HPBConference)
- Call for posters open until Feb 3, 2012
- Conference registration still open

Energy Modeling Conference – October 1-3, Atlanta GA

- [www.ashrae.org/EMC2012](http://www.ashrae.org/EMC2012)
- Call for papers open until Feb 15, 2012

Cold Climate Design - November 12-14, 2012, Calgary, Alberta, Canada

- [www.ashrae.org/ColdClimate](http://www.ashrae.org/ColdClimate)

## 7. Standards Subcommittee

Standards Subcommittee Chair: Theresa Weston (presented by Garth Hall)

- SSPC 90.1: Appendix AB and BB were approved.
- SSPC 90.2: has been resurrected.
- SSPC 160 is meeting tomorrow. Currently two addenda out for review. Comments have been received and will be reviewed by the committee.
- Proposal to a new guideline on retrofit of existing buildings. Peter Adams will be drafting a title, purpose and scope for this proposed guideline.

## 8. Old Business

Nothing to report.

## 9. New Business

- Google Sites Update: Anyone can send email to the site. Sub-committee Chairs can send email directly to the group.
- Thermal Envelope Conference, December 2013. Abstracts are due May 29, 2012 at ORNL.

### Motion 7

To adjourn meeting.			<b>SECOND:</b> Anton TenWolde
<b>FOR:</b> 9	<b>AGAINST:</b> 0	<b>ABSTAIN:</b> 0	<b>Note:</b> Chair not voting

- **DISCUSSION:** None  
**Motion Caries** –Meeting Adjourned at 4:07

Peter J Adams - Secretary, TC 4.4