

**TC/TG/TRG MINUTES COVER SHEET**

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

TC/TG/TRG NO.: TC 4.1 DATE: January 16, 2016

TC/TG/TRG TITLE: LOAD CALCULATION DATA AND PROCEDURES

DATE OF MEETING: June 29, 2015 LOCATION: Atlanta, GA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
<b>Voting</b> Steve Bruning Bob Doeffinger Suzanne LeViseur Jim Pegues Som Shrestha Larry Sun Chris Wilkins  <b>Non-Voting</b> Glenn Friedman Rolando Legarreta Stephen Roth Russell Taylor Justin Wong	2013 2014 2011 2014 2012 2014 2014	<b>Voting</b> Dan Fisher Doug Hittle  <b>Non Voting</b> David Ariyo Lucy Armankwah Chip Barnaby Fred Bauman Alireza Behfar Andrew Braum Sonia Brown Jui-Chen Roger Chang Charlie Curcija Christopher Delgado Philip Farese Dove Feng Joe Ferdleman Nirupama Lakshminarasimhan Stephen Kavanaugh Ken-Ichi Kimura Elyse Malherek Bryan Morris Gabrielle Powell Ghani Ramdani Brian Rock Ahmed Sleiti Jeff Spittle Branislav Todorovic Gary Wingfield Kevin Wood	2011 2011	<b>Visitors</b> Ben Alexander Zalhafira Alherfi J. R. Anderson Eric Griffin James Sweeney Ke Xu

DISTRIBUTION:  
 All Members of TC/TG/TRG

ADDITIONAL DISTRIBUTION:  
 TAC Chairman: Eric Adams, PhD  
 TAC Section Head: Michael Bilderbeck  
 Research Liaison: Prof. Xudong Yang  
 ALI/PDC: Darin W. Nutter, P.E.  
 2017 HB Fundamentals: David P. Yuill, P.E.  
 Standard Liaison: James Aswegan  
 Manager of Standards: Stephanie C. Reinche  
 Staff Liaison: Michael R. Vaughn

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

**June 29, 2015**  
**Committee Meeting Minutes**  
**TC 4.1 Load Calculations Data and Procedures**  
**Atlanta, GA**

1. Meeting called to order by Jim Pegues.
2. Roll Call – Secretary Sun
  - a. 7 of 9 voting members present.
3. Quorum present.  
Introductions
  - a. Motion to approve Chicago minutes as submitted: Suzanne LeViseur
  - b. Second: Steve Bruning
  - c. Vote 7-0-0 CV
4. Liaison Reports
  - a. Chapter Technology Transfer liaison, Harris Scheinman
    - i. We have allowed for provisional corresponding member through a website link.
  - b. David P. Yuill, Handbook Liaison
    - i. Chapter due July 2016
    - ii. Challenge is updates from TC 4.4 and TC 4.5 before we complete. David is happy to help push this along.
    - iii. Per Bruning, TC 4.5 research data will not be available for July 2016 so we can proceed.
  - c. Mike Bilderbeck, Section Head
    - i. Dennis Wessel will be new Section Head
    - ii. TAC is rolling out easier website tool
    - iii. New online roster tool will be forthcoming
    - iv. Only two TC's in Section 4 didn't make program. TAC is surveying past success rates
    - v. Kelley Cram will be new TAC/CEC liaison. She can champion our cause
5. Research Subcommittee – Chris Wilkins
  - a. RP-1616 LCM Update
    - i. Project is closed out
    - ii. Copies are in bookstore and well-stocked
  - b. RP-1681 – Low Energy Lighting
    - i. PMS met at this meeting
    - ii. Project is on schedule
    - iii. Technical discussions surrounded the test set ups, which were ultimately ok'd
      - Brian Liu and Joe Zhu were in attendance for update
      - Some initial tests are done
      - Committee asked for a few changes to check anomalies
      - There are some issues due to insulating conditions of test chambers and effects on room temp (it isn't uniform)
      - 30% of load is radiant

- There may be a sensor calibration problem
    - There will be a go to meeting next month to discuss anomalies
    - 0.5 degrees F=10 watts equivalent load
  - iv. Ongoing tests with final tests by Orlando. Final report by St. Louis
  - v. Completing a table for the next HOF should be ok
- c. RP-1631 (Co-sponsor) – Countertop Commercial Appliance Emissions
  - i. Rolando Legarreta is TC 4.1 liaison
  - ii. 50% of equipment is tested, and complete testing will be done by summer 2015
  - iii. Deadline of 2016 is no problem
- d. RP-1699 (Co-sponsor) - Update Weather Data
  - i. Sponsored by TC 4.2, Steve Bruning is TC 4.1's liaison.
  - ii. Contractor from Canada is Klimaat, Michael Roth.
  - iii. Project is on schedule
- e. WS 1742
  - i. Approved with noted comments.
  - ii. PMS will convene in Orlando
  - iii. Bids are being solicited and some are coming in
- f. RTAR 1729 – Non-uniform surface cooling loads.
  - i. Work statement was returned by RAC with conditional comments.
  - ii. Updates should be minimal and Chris will make them
  - iii. Email ballot after Chris updates
  - iv. Bruning suggests test with and without ventilation. Ventilation amount should be code minimum for “office” conditions
  - v. The original project intent was to understand radiant heat exchange for non-uniform surfaces. Ventilation was not a focus and only included for reference. Perhaps ventilation impact is another research project.
- g. New Research
  - i. There is a joint sponsor request from TC 5.10 for dishwashing equipment, hooded and non-hooded conditions at entry and exit of dishwasher will be studied. Doeffinger indicated that this is similar to Lab Autoclave applications.
    - Motion to approve joint sponsor: Suzanne LeViseur
    - Second: Steve Bruning
    - Vote 6-0-0 CNV
  - ii. LCM Update:
    - Chris has investigated with RAC how to proceed
    - We can submit direct WS, RTAR's are now optional
    - Bruning expressed concern with delay of LCM updates with corresponding HOF update. Best for LCM update to come in winter meeting after HOF. In this case, January 2018.
    - LCM has much more info than HOF
    - Pegus can circulate draft WS for committee review with goal to have e-ballot and submit in this cycle.
  - iii. Per Programs discussion, some research should occur with TC 4.2 on design day weather profile generation. Wilkins, Bruning and Wong will start on RTAR.

6. Programs/Standards Subcommittee Report – Glenn Friedman
  - a. See attached handout for Programs/Standards Subcommittee Meeting. Programs.
    - i. Two programs at this meeting.
    - ii. #1 - Mobile apps for loads and more. Stephen Roth, and Nick Long NREL. Talk to 7.3 to co-sponsor. Loads and energy audits and maintenance.
    - iii. #2 – Workshop – Joe Huang and Steve Bruning, Design day reanalysis. Joe feels we have enough data to analyze a better way to figure out design days. Co-sponsored with 4.2. Data gathering. 4.2 has chosen not to run with this. Joe Huang, White Box Technologies.
  - b. .Other Programs:
    - i. There is a residential track for Orlando.
    - ii. Load Calc Back to Basics will be Wilke submitted for Orlando
    - iii. Residential loads will be submitted for one hour seminar in Orlando on Code/ACCA methods and current state of art (Barnabey)
    - iv. BIM and Loads: Hold for St. Louis
    - v. Bronco is still trying for dual facades presenter
      - International track may offer unique opportunity
      - International members as presenters is a challenge due to schedule and economics.
    - vi. Wilkins stated Jeff Haberl is still looking for support for putting together a session on history of load calcs. This did not get approved for Atlanta but will be submitted for Orlando.
  - c. New business:
    - Probably presentation of results for RP-1631 as a seminar in Orlando. Joint with TC 5.10
  - d. Motion for Orlando Workshop: “Back to Basics”: Chris Wilkins
    - Second: Suzanne LeViseur
    - Vote 6-0-0 CNV
    - ii. Discussion: Future Programs
      - Dual Face Design (ORL)
      - Motion for TC 4.1 to support Jeff Haberl (ORL): James Pegues
        - Second: Suzanne LeViseur
        - Vote 6-0-0, CNV.
      - Motion for BIM and Loads for St. Louis: Larry Sun
        - Second: Suzanne LeViseur
        - Vote 6-0-0, CNV.
7. Standards
  - a. No new standards at this time
  - b. Standards SPC-203 Method of Test for Determining Heat Gain of Office Equipment is published and we should try to push it out to “equipment” industry for uniform testing.
8. Handbook Subcommittee – Steve Bruning
  - a. See attached Minutes of the Handbook Subcommittee Meeting with reviewer comments and tables that need updating for 2016.

- b. Updating tables is most critical and useful to members. Minutes reflect those who will do updates and schedule, research seems to be on track for inclusion. Other updates as noted in minutes are critical.
  - c. Chapter 17: Chip Barnaby is reviewing some comments
  - d. Chapter 18:
  - e. First Draft Markup Review - Steve Bruning distributed first draft mark-up. Subcommittee reviewed mark-up page by page. Bulk of changes are in tables, not text.
  - f. Agreed to add table with fractional/small horsepower motors to be more representative.
  - g. Update to CTS and RTS tables- will use Load Calculation Manual tools to recalculate. Walls and roofs will be updated to reflect higher insulation values per 90.1-2013. A mix of existing data, updated construction meeting current 90.1-2013 along with high performance examples complying with 189.1. Steve Bruning will pull together for presentation at January meeting.
  - h. Chapter variables list review - Jim Pegues presented his analysis. Agreed direction to standardize on variable blocks adjacent to equations instead of centralized. Uniform definition of variables will be incorporated. Jim will review other TC chapters for common use of variables and judge applicability to our chapter.
  - i. Chris Wilkins is compiling measured data from literature for both individual equipment items and plug load densities (w/sf) to update those tables.
  - j. Bob Doeffinger will review reports and papers for update of medical equipment table.
  - k. Justin Wong will update Table 13 to Window 7.3 if any differences.
  - l. Steve Bruning will check need for fan heat reference versus text on following page. Can it be deleted? Update all references to other chapters in Table 25.
9. TC 4.1 Web Site
- a. Jim Pegues stated the web site is up-to-date.
  - b. There is a movement in ASHRAE to update look of website.
  - c. Jim asked for suggestions for improvements
10. Old Business – Email Ballots
- a. E-mail Ballot: 5/1/2015. Motion: Approve the 4/23/2015 revision of WS-1729 - Experimental Verification of Cooling Load Calculations for Radiant Systems for submission to the Research Activities Committee. Vote: 8-0-0-1-CV (for/against/abstain/absent)
  - b. E-mail Ballot: 5/15/2015. Motion: Approve and accept the final project report for RP-1616. Vote: 7-0-0-2-CV (for/against/abstain/absent)
11. New Business
- a. Membership:
    - Three (3) members are rolling off on June 30
    - Three (3) new members: Rolando Legarreta, Glenn Freidman, Jeff Spitler
    - Provisional members will become corresponding members
  - b. There is a new focus on residential topics. It is part of a new ASHRAE strategic plan and there is a task group approved.
  - c. CEC is looking for future track options

- d. MTG – Multi-disciplinary Task Group are created to support multiple TC efforts to support ASHRAE activities. Section 4 was approached about “MTG on operations and maintenance”. We don’t see any relevance. LeViseur brought forth “MTG on Occupant Behavior”, again not relevant to us.
  - e. Jay Anderson has been tasked with evaluation of all standards and guidelines (150+) and how they relate to commissioning.
  - f. SPC-209: Use of building simulation for building design process. Taylor and Shrestha are involved in SPC and some feedback may be coming on “load reduction” process. This is done in “energy” process, not a “load” process, so we should be aware. Still very early in process and not clear if formal review will be implemented.
  - g. Justin asked if a program can be put forth on using energy modeling tools for load calc. There was a program recently, but another can be considered.
  - h. Wilkins has been assigned to RAC and needs a replacement. Bob Doeffinger will carry for next year.
12. Motion to Adjourn: LeViseur honorary for Hittle
- Second: Jim Pegues
  - Vote: 6-0-0, 1 absent, CV

Attachments:

1. Handbook Subcommittee Report
2. Program/Standards Subcommittee Report
3. Atlanta Agenda
4. Sign-In Sheet



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TC4.1 Load Calculation Data & Procedures

Atlanta, Georgia

June 27-July1, 2015

**Handbook Subcommittee Report**

Sunday, June 28, 3:00 PM to 4:00 PM

Hilton Atlanta, Pavilion 1 (2)

1. Handbook Committee Liaison Comments: David Yuill, Liaison to TC4.1.
  
2. Schedule for 2017 HoF Chapters:
  - 2015 June – Rough draft overall chapters
  - 2016 January – Full draft overall chapters reviewed by Handbook subcommittee
  - 2016 April – Deadline for new research results to be incorporated in chapters
  - 2016 June – Final chapters approved by full TC**
  - 2016 July 12 – Chapter 17 submitted to Yuill/ASHRAE
  - 2016 July 19 – Chapter 18 submitted to Yuill/ASHRAE
  - 2017 June – HoF Published
  
3. Chapter 17 Residential Loads:
  - a. Review from Jaya Mukhopadhyay – Chip Barnaby will evaluate.
  - b. Target is to have draft by January 2016 meeting and final approval at June meeting.
  
4. Chapter 18 Non-Residential Loads:
  - a. First Draft Markup Review - Steve Bruning distributed first draft mark-up. Subcommittee reviewed mark-up page by page. Bulk of changes are in tables, not text.
  
  - b. Agreed to add table with fractional/small horsepower motors to be more representative.
  
  - c. Update to CTS and RTS tables – will use Load Calculation Manual tools to recalculate. Walls and roofs will be updated to reflect higher insulation values per 90.1-2013. A mix of existing data, updated construction meeting current 90.1-2013 along with high performance examples complying with 189.1. Steve Bruning will pull together for presentation at January meeting.

- d. Chapter variables list review – Jim Pegues presented his analysis. Agreed direction to standardize on variable blocks adjacent to equations instead of centralized. Uniform definition of variables will be incorporated. Jim will review other TC chapters for common use of variables and judge applicability to our chapter.
- e. Chris Wilkins is compiling measured data from literature for both individual equipment items and plug load densities (w/sf) to update those tables.
- f. Bob Doeffinger will review reports and papers for update of medical equipment table.  
*from Kaiser Paper.*
- g. Justin Wong will update Table 13 to Window 7.3 if any differences.
- h. Steve Bruning will check need for fan heat reference versus text on following page. Can it be deleted? Update all references to other chapters in Table 25.



**TC 4.1 Programs/Standards Subcommittee Discussion Minutes**  
**Atlanta, Sunday, June 28, 2015**

Glenn Friedman, Program Chair

**PROGRAMS**

1. Current Programs
  - a. Atlanta
    - i. ASHRAE Design Day Weather Data – Da Yan, Eric Peterson, Joe Huang and Steve Bruning
    - ii. Mobile Applications: HVAC Loads, Energy Audits and Operations - Stephen Roth and Richard Szydlowski
2. Future Programs
  - a. Seminar and Forum Due Date: August 10, 2015
    - i. Back to Basics: The Science, Application and Art of Load Calculations. Applicable to young engineers. Track 2: Fundamentals and Applications, Track. Voted and approved.
      1. Science: New ASHRAE Load Calculations User's Manual and the current overview of load calculations, by Jeff Spittler
      2. Application: Zoning and load calculation basics, what do you do early in design when you don't have all the answers, by Larry Sun
      3. Art: Case studies, horror stories, what to watch for, and odd-ball cases, by Steve Bruning
    - ii. Residential Loads: There is a residential track at the next meeting. What are the code requirements? Would Glenn Hourahan, ACCA, support this with a speaker? Add a third speaker for multifamily residential, or maybe leave this out? 1) CLTD, ACCA Manual J, 2) Current ASHRAE Chapter 17, and 3) Where is this going? 2 and 3 by Chip. Stephen Roth works the residential load market, too. Voted and approved.
    - iii. Dual facades by Branco is a possibility. Branco has a PhD dissertation on this. He is ready to come. Branco has other papers and people. Berkeley professor on the influence of furniture on cooling loads. Plan for this for papers in St. Louis or seminar in Orlando. There is an international track in Orlando. Supported if Branco has speakers.
    - iv. Jeff Haberl is doing a session on the history of load calculations, "Session #16796 - 2015 ASHRAE Annual Conference, Session Title Peak Envelope Cooling Loads: How did we get to today? Is this where we want to be?" TC4.1 is asked to co-sponsor. To be resubmitted for Orlando. Voted and approved.
    - v. BIM and Load Calculations Seminar Update [delay for St Louis], *Roth, Bruning, Wilkins*. This will take time and work so maybe for beyond Atlanta. Work with MTG- BIM (MTG=Multidisciplinary Task Group). John Kennedy alleges there are improvements. Discuss what value it has in BIM to Load. Is it working? Should this "BIM in Practice" be an MTG BIM seminar rather than a TC4.1 seminar (Chris Wilkins). Voted and approved.
    - vi. 1631 is looking for us to co-sponsor a seminar session in Orlando.
  - b. Orlando, Jan 23-27, 2016
  - c. St. Louis, Jun 25-29, 2016
3. Future Program Ideas
  - a. Future Seminar Session Proposals
    - i. Atrium and large space load calculations, empirical case studies
    - ii. Ventilation and infiltration

**TC 4.1 Programs/Standards Subcommittee Discussion Minutes**  
**Atlanta, Sunday, June 28, 2015**

- iii. How Load Calculations Interact with Other ASHRAE Chapters
  - Weather
  - Infiltration
  - Building skin color
  - Ventilation
  - Fenestration, dynamic windows

## **STANDARDS**

1. Standard SPC-203 Method of Test for Determining Heat Gain of Office Equipment Used In Buildings - outreach to TC's and SPC's in Atlanta

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### Program Tracks

- **Track 1: Systems and Equipment**  
*Track Chair: Gary C. Debes*  
**Email:** [gcdebes@verizon.net](mailto:gcdebes@verizon.net)  
Selection of equipment and systems is paramount to HVAC&R design. Papers and programs in this track will assist designers, engineers, and operators in the design, selection, and operation of HVAC&R systems and equipment.
- **Track 2: Fundamentals and Applications**  
*Track Chair: Cynthia Moreno*  
**Email:** [cindym@tmmechanical.com](mailto:cindym@tmmechanical.com)  
Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow, IAQ, and building envelope. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.
- **Track 3: Design Build**  
*Track Chair: James Liston*  
**Email:** [jfliston@verizon.net](mailto:jfliston@verizon.net)  
Joining the contractor and the designer into the same team, the design-build method of project delivery is increasing in percentage of projects awarded in the US. This track explores the challenges and benefits of D-B project delivery. Highlight successful projects; discuss contracts; review management responsibilities; offer alternative design and construction processes. These topics and more will be included.
- **Track 4: International Design**  
*Track Chair: Leon Shapiro*  
**Email:** [leoneshapiro@gmail.com](mailto:leoneshapiro@gmail.com)  
Design for various environmental elements, geography and culture demand that new and innovative strategies be developed. As an international organization, ASHRAE strives to meet the needs of a global membership. HVAC&R systems vary globally and this track provides an opportunity to share innovative and necessary design elements that can be shared internationally.
- **Track 5: Standards, Guidelines and Codes**  
*Track Chair: Michael Collarin*  
**Email:** [Michael.Collarin@parsons.com](mailto:Michael.Collarin@parsons.com)  
ASHRAE is known for its standards and design guidelines – and they are constantly evolving with the intent on improving the built environment and its systems. Designers, Contractors, Architects and Owners must be able to keep up with the continuing changes in the current cycle but to also be prepared for the future changes. In addition, there is a large interaction of ASHRAE with the code authorities and government to incorporate these standards and guidelines. The series of sessions in this track highlight the changes to the standards and guidelines, their projected path and optimum design techniques to meet or exceed the standards.
- **Track 6: Cutting-Edge Technologies**  
*Track Chair: Ann Peratt*  
**Email:** [agregg.ksu@gmail.com](mailto:agregg.ksu@gmail.com)  
As energy codes become increasing more stringent, we are challenged to find creative ways to improve efficiencies in the effort to achieve net zero buildings. This track will include the most recent advances in HVAC&R system design, equipment, and construction techniques. Programs included will focus on efficiency, responsible use of resources and energy recovery.
- **Track 7: The Great Debate**  
*Track Chair: Chuck Curlin*  
**Email:** [ccurlin@shultzeg.com](mailto:ccurlin@shultzeg.com)  
Engineers commonly weigh multiple solutions to find the best match for a certain project. Centralized or Decentralized heating and cooling? Chemical or non-chemical water treatment? These sessions and papers will present divergent methods for accomplishing the same task. Hear all sides of the debate and decide for yourself.
- **Track 8: Modern Residential Systems**  
*Track Chair: Jennifer E. Leach*

**TC 4.1 Programs/Standards Subcommittee Discussion Minutes**  
**Atlanta, Sunday, June 28, 2015**

**Email:** [pennst8jen@yahoo.com](mailto:pennst8jen@yahoo.com)

Engineering for residential HVAC and plumbing systems and equipment used to be referred to as catalog engineering: for a two bedroom house choose one from Column A; for a three bedroom house choose one from Column B. Recent years have seen a boom in energy efficient solutions for the savvy, fiscally-conscience home owner. From glazing to water heating to lighting, this track will provide you with the latest advances for the residential market.

**Conference Program Chair: Jennifer Leach**

Email: [pennst8jen@yahoo.com](mailto:pennst8jen@yahoo.com)



# ASHRAE Technical Committee 4.1

## Agenda for - TC4.1 Load Calculation Data & Procedures

**Atlanta**  
**June 29, 2015**

**TC4.1 Load Calculation Data and Procedures**  
**Monday, 2:15 PM to 4:15 PM**  
**Room 406, 4<sup>th</sup> Floor**  
**Atlanta Hilton**

- |  |                          |
|--|--------------------------|
| 1. Call to Order   | Jim Pegues               |
| 2. Roll Call   | Larry Sun                |
| 3. Introduction of Visitors                                | Jim Pegues               |
| 4. Approval and/or Corrections to Montreal Meeting Minutes | Jim Pegues               |
| 5. Liaison Comments  |                          |
| Section Head   | Michael Bilderbeck       |
| Chapter Technology Transfer                                | Dr. Eric Adams           |
| Research   | Prof. Xudong Yang        |
| Handbook   | David P. Yuill           |
| ALI/PDC  | Dr. Darin W. Nutter, PE. |
| Programs   | -                        |
| Standards Liaison  | James Dale Aswegan       |
| Staff-Research/Tech Services                               | Michael R. Vaughn        |
| Staff-Standards  | Stephanie Reiniche       |
| 6. Research Subcommittee Report                            | Chris Wilkins            |
| 7. Programs Subcommittee Report                            | Glenn Friedman           |
| 8. Standards Subcommittee Report                           | Glenn Friedman           |
| 9. Handbook Subcommittee Report                            |                          |
| Residential Chap 17  | Chip Barnaby             |
| Non-Residential Chap 18                                    | Steve Bruning            |
| 10. ASHRAE Website for TC 4.1                              | Jim Pegues               |
| 11. Old Business   | Jim Pegues               |
| 12. New Business   | Jim Pegues               |
| 13. Adjournment  | Jim Pegues               |



# ASHRAE Technical Committee 4.1

## Meetings

### TC 4.1 Load Calculation Data and Procedures

Monday 2:15-4:15p  
(Room 406, 4<sup>th</sup> Floor)

### TC 4.1 Handbook Subcommittee

Sunday 3:00-4:00p  
(Pavilion 1, 2<sup>nd</sup> Floor)

### TC 4.1 Research Subcommittee

Sunday 4:00-5:00p  
(Pavilion 1, 2<sup>nd</sup> Floor)

### TC 4.1 Programs & Standards Subcommittees

Sunday 5:00-7:00p  
(Pavilion 1, 2<sup>nd</sup> Floor)

### TC 4.1 RP-1681 Project Monitoring Subcommittee

#### Low Energy LED Lighting Heat Gain Distribution in Buildings

Sunday 2:00-3:00pm  
(Pavilion 1, 2<sup>nd</sup> Floor)

### Seminar 23

#### Climate Change: ASHRAE Design Day Weather

Monday 8:00-9:30am

(Salon D)

*(Yan, Peterson, Huang, Bruning)*

### Seminar 27

#### Mobile Applications: HVAC Loads, Energy Audits and Operations

Monday 9:45-10:45am

(Salon D)

*(Roth, Szydlowski)*

#### Introduction of officers and voting members for 2015:

Jim Pegues	Chair	Voting
Robert Doeffinger	Vice Chair	Voting
Larry Sun	Secretary	Voting
Steven Bruning	Handbook Subcommittee Chair	Voting
Chris Wilkins	Research Subcommittee Chair	Voting
Glenn Friedman	Standards/Programs SubC Chair	Non-Voting
Dan Fisher		Voting
Doug Hittle		Voting
Suzanne LeViseur		Voting
Som Shrestha		Voting

# TC 4.1 Sign-In Sheet - Atlanta June 2015

YEA	Name	Status	Affiliation	E-mail
1	LARRY SUN	MBP-SEC	tkIsc	lsun@tkIsc.com
2	JIM PEGUES	VN-CHAIR	CARRIER	James.F.Pegues@carrier.utc.com
3	Russell Taylor	CM	UTC	rtaylor@utrc.utc.com
4	✓ KE XU	Guest	UTC	ke.xu@utc.com
5	ERIC GRIFFIN	Spectator	POSITIVE ENERGY	ERIC@POSITIVEENERGY.PRO
6	SUZANNE LeViseur	VM	Huddled Engineers	sleviseur@huddledeng.com
7	Justin Wong	CM	Team Catalyst	justin@teammotivator.com
8	Steve Bruning	VM	Newcomb & Boyd	stbruning@newcomb-boyd.com
9	Tom Shereshe	VM	ORNL	shereshe@ornl.gov
10	Chris Wilkins	VM	CRB Engineers	chris.wilkins@crbusa.com
11	G R Anderson	Guest	Anderson Eng	grhage@outlook.com
12	Ben Alexander	Guest	US Army Corps of Engineers	Ben.L.Alexander@usace.army.mil
13	Glenn Friedman	NUM	Taylor Engineering	
14	Rolando Legareta	CM	Alegro Engineering	rolando@alegro-engineering.com
15	Bob Doe-Finger	VM	ZMM, Inc	rd@zmm.com
16	Stephen Roth	NVM	Carmel Soft.	sroth@carmelsoft.com
17	✓ JAMES SWANK	Guest	TAMU R&E	jswan@TAMU.EDU
18	Zuhaira Alhufi	Guest	University of Mary	Zalhafid@gmail.com
19				
20				
21				
22				