

2011 ASHRAE WINTER MEETING
Las Vegas, NV

TC8.11 Unitary and Room Air Conditioners and Heat Pumps
Monday, Jan 30, 2010 4:15 – 6:30 PM
Location: Las Vegas Hilton - Pavilion 6

Theme/Logo



Sponsored Program

Seminar 3: Low GWP Refrigerant Options for Unitary Equipment. (Sun, 8 – 9:30 am)
Location: Hilton – Pavilion 6

Full Committee Agenda

1. Call to order Horak
 - a. The meeting was called to order at 4:18 p.m.
2. Introductions All
 - a. Introductions were made
3. Determination of a quorum Horak
 - a. TC 8.11 has 12 voting members, 7 were present at the start of the meeting with one more joining later for a total of 8 members. Number of voting members required for a quorum is 7, so quorum was met.
4. Announcements Horak
 - a. Highlights from TC Chair's Breakfast Meeting
 - i. 2010-11 Hightower Award winner Gary Phettleplace, TC 6.2 & 6.8
 - ii. Improvements being made to roster system for 2011-12
 - iii. Upcoming Advanced Energy Design Guide (AEDG) Board Peer Reviews.
 1. February 14 through Feb 25
 - Energy Efficiency Guild for Existing Commercial Buildings: Technical Implementation – 60% Draft

2. February 21 through March 4
 - 50% Advanced Energy Design Guide for K-12 School Buildings – 60% Draft
 3. April 18 through April 29
 - Performance Measurement Protocols: Best Practices Guild – 60% Draft
 4. April 25 through May 6
 - 50% Advanced Energy Design Guide for K-12 School Buildings – 90% Draft
 5. <http://www.ashrae.org/technology/page/938>
- iv. Conferences and Expositions Committee Proposed or Recently Implemented technical program changes
1. All Society technical programs going forward will include the following two broad tracks in order to provide space for almost any high-quality TC program submitted:
 - HVAC&R Fundamentals & Applications
 - HVAC&R Systems & Equipment
 2. The eight tentative tracks for the 2012 Annual Meeting in San Antonio are as follows:
 - Alternate Technologies
 - Integrated Energy Systems
 - Indoor Environmental Applications
 - Building Modeling Applications
 - Specialized Applications – Archival Museum & Assembly Spaces
 - Refrigeration Applications
 - HVAC&R Fundamentals & Applications
 - HVAC&R Systems & Equipment
- v. New “Help Wanted” section for TC’s to be added to ASHRAE website
- vi. TC’s can advertise for help, request members, webmaster, etc
- vii. Upcoming Program Dates
1. Montreal June 25-29, 2011
 - Theme: Net Zero Buildings

- Seminar and Forum Sessions are due by February 14, 2011
- Final Technical Papers & Full Conf. Papers are due March 7, 2011

2. Chicago Jan 21-25, 2012

- Theme: The Impact of HVAC&R on our Daily Lives
- Seminar and Forum Sessions are due by April 18, 2011
- Final Technical Papers & Full Conf. Papers are due June 3, 2011

3. San Antonio June 23-28, 2012

- Theme: NONE
- Seminar and Forum Sessions are due by TBD
- Final Technical Papers & Full Conf. Papers are due TBD

viii. Upcoming Forums, Workshops and Conferences

1. Energy Modeling: Tools for Designing High Performance Buildings, April 4-6 2011, Atlanta, GA:
<http://www.ashrae.org/energymodeling>
2. 10th IEA Heat Pump Conference 2011, May 16-19 2011, Tokyo, Japan, www.hpc2011.org
3. 14th European Conference, Part 2: Latest Technologies in Renewable Energy and Applications in Heating and Cooling, June 10-11, 2011, Milan, Italy – <http://www.EUenergycentre.org>
4. ECOS 2011 (24th Intl Conference on Efficiency, Cost, Organization, Simulation & Environmental Impact of Energy Systems), July 4-7, 2011, Novi Sad, Serbia – <http://www.ecos2011.com>

ix. Border Entry/Exit requirements for 2011 Annual Meeting in Montreal, Canada

1. Requirements changed since 2006 meeting in Quebec City
2. Need a passport if flying
3. If driving, need a passport or enhanced drivers license. Can't get back into without one of those

5. Agenda additions

All

- a. From Albuquerque meeting: "Tom Watson introduced representative of the UNEP Program. Topic: Refrigerants for room AC and small AC's. Very difficult to understand the process of getting refrigerants approved. Can they work with ASHRAE on working with LOW GWP refrigerants in low charge units."

- b. Dutch Uselton gave an update on the work that had been done on this project for UNEP. Dutch is in the process of putting together a list of any applicable standards that deal with natural or low GWP refrigerants. During the search he came across a document published by GTV and Proclima that describes guidelines for using hydrocarbons in refrigeration systems.

- 6. Liaison reports (as they arrive) Liaisons
 - a. None

- 7. Approval of minutes from Louisville Berg
 - a. Mark spatz moved to approve minutes, Craig Messmer seconded. Vote was unanimous. 8-0-0.

- 8. Membership/Roster Horak
 - a. Voting roll-off 7/1/11: Cremaschi, Li, Murphy, and Singh. Eckhard Groll will also be leaving the committee due to new responsibilities on the Board of Directors Committee.
 - b. Replacement voting members
 - i. Received 5 volunteers for voting members and several corresponding member requests. Don Schuster will get the roster updated with the new members.

- 9. Subcommittee reports
 - a. Programs Mark Spatz
 - i. Las Vegas
 - 1. "Low Global Warming Refrigerants for Unitary Equipment" (Don Schuster chair) was submitted and presented at this meeting. There were four speakers planned (Mark Spatz, Tom Leck from DuPont, Groll, Steve Brown of Catholic University, and Nicholas Cox of Earthcare) however the last speaker could not make the meeting. The seminar was well attended.
 - 2. A forum was submitted on compressor performance modeling by Ray Rite but was not approved.
 - ii. Future Potential Programs – from June 2010 meeting.
 - 1. "Back to Basics" was suggested by Ray Rite. Topics could include ACFM vs SCFM, Duct design, Variable speed vs constant speed design considerations.
 - 2. "New Methods for Performance Predictions for Unitary Equipment" (Ray Rite chair). Preference was for conference papers (Note: If there is still interest, this would have to be for Chicago and abstracts must be submitted by April, 2011. Potential topics:
 - 3. Linear fit matching evaporator performance to condensing unit performance (Vance Payne)
 - 4. Integrated Energy Efficiency Ratio (IEER) issues – possible speaker Dick Lord of Carrier.
 - 5. Prediction of Cd – Brian Dougherty's previous work.
 - 6. "Moisture Management for Net Zero Buildings" Bill Murphy chair. 2 to 3 speakers identified could be either seminar for Vegas or papers for Montreal. (Note: This was either not submitted or not approved, but can consider for a Montreal seminar or Chicago conference paper session if there is interest).
 - 7. Seminar that was submitted for Albuquerque by Ram on "Taking Energy Efficiency to the Next Level thru Standards" was not approved for this meeting. No interest in re-submitting for future meetings.
 - iii. New Potential Programs

1. Impact on Extreme Climates on Performance of Unitary A/C and Heat Pumps. M.Spatz agreed to chair this seminar for Montreal. Potential speakers are Ram and Rus Johnson (if he can get permission from client). Would like to get one additional speaker maybe one from a hot climate.
2. Additional presentation topics suggested:
 - Roof top unit controls – Reid
 - Simplified method of determining seasonal COP – Rus Johnson
 - Insitu energy determination - Dale

b. Research

Ray Rite

i. Research Chair Breakfast - Monday, 31 January 6:30AM

1. Service to ASHRAE Research – Steve Taylor-TC 4.3.
2. Grant-in-Aid, New Investigator, Homer Adams Awards
3. \$1.3M in 2011-12 for new projects
4. 23 TRPs, 18 out for bid in the Spring
5. Working on framework for Multi-disciplinary Task Groups, e.g. NIST project
6. ASHRAE sanctioned forum on Next-Generation Low Global Warming Potential Ref., Tu 2/1, 8-9:30AM, LVCC N256
7. Research Meeting: Sunday, 30 January 2-4PM Hilton Conference Room 14

ii. Research

1. Complete - none
2. In-Progress- none

iii. Work Statements

1. Accepted
 - WS1581 - “Develop alternate setup guidelines for Unitary Air Conditioner test configurations which cannot adhere to ASHRAE specified duct dimensions and external pressure tap locations” (PES: Eric Berg (chair) Chad Kirkwood, Byron Horak, and Ray Rite) Ready for bid. To be prioritized on Wednesday.
2. In-Progress
 - WS1608 - Develop Comprehensive Performance Rating (CPR) for Unitary HVAC, Phase 1. (Reid Hart)
 - Reid is actively recruiting some assistance to address RAC comments. Will continue to work on this hopefully for 15 May.

iv. RTARs

1. Submitted
2. In-Progress
3. Proposed
 - Improved Compressor Performance Modeling Methodology for use in System Simulation Programs (Ray Rite) – Attached here.
 - Spirited discussion. Wide-spread support among unitary TC members but compressor OEMs have issues. Xudong Wang from AHRI relayed concerns: don't think physics-based will be good enough to reflect small design changes in compressors that gets done now, already have internal methods, unitary designers should come up with their own methods if they want, scroll of no use to rotary OEMs. What to do: Need to go to AHRI unitary members and get support to counter compressor concerns. Get names of AHRI 540 members and engage them in discussions, send RTAR to Ed Vineyard and Van Baxter to inquire if hot water heat pumps has

interest in a better compressor model. In order to demonstrate TC support for this RTAR a motion was made at the subcommittee.

- Motion: Subcommittee moves to recommend that full TC 8.11 vote for approval of this RTAR. Horak/Cremaschi
- Action Item: Rite will solicit AHRI unitary members for comments, engage AHRI 540 members, forward RTAR to Ed Vineyard and Van Baxter. TC 8.1 voted to approve RTAR on 2/1. Will submit to RAC.

4. Co-sponsoring requests

- TC 8.4 has two opportunities:
 - "Investigation of Air-side Fouling on Outdoor Condensing Heat Exchangers"
 - "A Research Study to Determine and Compare New Accelerated Corrosion Tests for Microchannel and Standard Tube & Fin Heat Exchangers"
- TC 8.10 should have one at Montreal:
 - Sizing Residential Dehumidifiers
 - Dane and John Bloomer are working on an RTAR that would result in a project to deliver a manual for the sizing of residential dehumidifiers. Dane plans to bring document to Montreal for review by this committee.

v. Research Ideas

1. Existing Ideas

- Eliminating Cyclic Testing - Estimating Cd (Eric Berg)
- Current default Cd is 0.25. Brian Dougherty statistical summarized AHRI manufacturer data a few years ago and developed more realistic number but nothing was done with this work.
- New project would need to address geometry and mini-split systems. Variable speed has very minimal Cd since you can modulate way down. Project would be to get AHRI data and statistically analyze it. May not have all geometry required. Need AHRI on-board to supply data. All members want to get rid of Cd testing due to the pain. EEVs need to be addressed.
- Action Item: Eric Berg and Don Shuster volunteered to write RTAR.
- Unaccounted for Application loads including Solar on OD Units (Dane Christianson)
- Southern Cal Edison has collected some data. TC 6.3 was also interested. Thought was that perhaps Building Simulation TC 4.7 would be interested.
- Action Item: Rite to pursue with Bldg. Sim. 4.7 to see if anyone there is interested. We would co-sponsor. Ram N. volunteered to help.
- Fouling/Damage of Heat Exchangers in Applications (Eckhard Groll) – what is the effect of fouling/damage on coil performance in units. See co-sponsorship opportunities.

- Effect of high altitude on air flow from a fan watts and capacity perspective on packaged equipment – (Ram Narayanamurthy)
- Current corrections are sufficient – Dane. Can remove from list.
- Rooftop Unit Durability – effect of degradation on reliability of a unit over time
- Need to assess 5, 10 year reliability. What is really needed maintenance-wise? There is already a project in Michigan on a small scale (NREL). HVAC units in foreclosed homes are being removed and assessed for performance: Could use broader data base.
- Action Item: Dane/Ram volunteered to work on RTAR.
- Low temperature Applications of Heat Pumps (Horak)
- NRCAN is adding lower rating point, 0F. May have backed off of this according to Craig Messmer. Van B. mentioned other groups with interest in cold climate heat pumps, could be a co-funding opportunity. DOE is very interested in low ambient conditions in general. Johnson Research (Russell Johnson) has been doing low ambient testing over 9 yrs. for various clients. Two research ideas came up: defrost and sizing.
- Effective defrosting in -20 to -30F conditions. Algorithms for low ambient. (Russell)
- How to economically size heat pumps under these conditions. Recommended ranges for different climates.
- Action Item: Dutch U./Van B. volunteered to work on RTAR
- Systems for NZE homes. Main concern is AH fan turn down and air distribution. Need guidance on zoned systems. - Ram
- HFC replacements. HFOs and others. (Rite)
- Too early. Don't quite know what we need to look at.
- Regional Efficiency Standards
- Hot dry climates. What to do if there is no data. Major manufacturers have it, but 3rd party mix matches don't. Not clear what the project is here.

2. New Ideas

- Charge Adjustment – Reid Hart
- Do we need to have a standard methodology for how to verify that you have the correct charge? (California has come up with its own method.) Options include: weighing charge, SC, approach temperatures. Do we need to have this standardized or is this up to each manufacturer to get it right for their equipment which they should know best?

c. Handbook

Lorenzo Cremaschi

- i. Chapter 1 of applications – has been submitted. Should get a proof copy back in February from editorial dept.

- ii. Chapter 48 and 49 of System and Equip – Working on getting all the comments in.
- iii. There was discussion about VRF systems and how they should be addressed in our chapter now that TC 8.7 for VRF systems has been formed. There is a short section in our chapter. Does the section need to be removed or left in with a reference to the new VRF chapter. The action from the discussion was to determine which book the chapter will be in. That might change what we put in our section.
- iv. Will send out chapters 48 and 49 for review by voting members in April. There will need to be a vote on it at the Montreal meeting. The deadlines for submittal are July 4th and 11th, for chapters 48 and 49 respectively.
- v. Dutch Useton made the comment that replies should be made to the reviewers to give them some feedback. Let them know what action we are taking and why. This should keep them engaged and will hopefully entice them to review a chapter again in the future.
- vi. CD plus is going away. Extra content online will be available online. It will be possible to make changes to online content at any time then the changes will be made when the next edition is published.

d. Standards

Chris Stone

i. [ANSI/ASHRAE 16-1983 \(R2009\)](#)

1988

Standard 16-1983 (R2009) -- Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners (ANSI Approved)

- 1. SPC Chair: Mark Paquette
- 2. SPC Liaison: Janice Peterson
- 3. Standards 16 and 58 are being combined into one standard with the number designation being 16. Standards Project Committee (SPC) 16, *MOT for Rating Room Air Conditioners and Packaged Terminal Air Conditioners/Heat Pumps* meets on Tuesday, February 1, 2011 from 8:00 am to Noon. To maintain its ANSI accreditation, Standard 16 was reaffirmed in 2009 while the SPC continues its current revision process. Chairman Paquette reports that the committee is making progress on the revision and expects to have the draft completed by the second half of 2011.

ii. [ANSI/ASHRAE 37-2009](#)

2009

Standard 37-2009 -- Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment (ANSI Approved)

- 1. Standard has been reaffirmed in 2009.

iii. [ASHRAE 58-1986 \(R2009\)](#)

2009

Standard 58-1986 (R2009) -- Method of Testing for Rating Room Air Conditioner and Packaged Terminal Air Conditioner Heating Capacity (ANSI/ASHRAE Approved)

- 1. See discussion provided above under Std 16-1983 (R2009).

iv. [ASHRAE 116-2010](#) (2010)

Standard 116-2010 -- Methods of Testing for Rating Seasonal Efficiency of Unitary Air Conditioners and Heat Pumps

- 1. SPC Chair: John Talbott
- 2. SPC Liaison: Allan Fraser
- 3. Standard 116 has completed the update and has been released in 2010.

v. [ANSI/ASHRAE 137-2009](#) (2009)

Standard 137-2009 -- Methods of Testing for Efficiency of Space-Conditioning/Water-Heating Appliances that Include a Desuperheater Water Heater (ANSI/ASHRAE Approved)

- 1. Lead TC: 6.6 (Service Water Heating)

2. Co-cognizant TC: 8.11
3. The ASHRAE Reaffirmation process and ANSI accreditation of Standard 137 was completed in January 2009. Although the cognizant technical committees may recommend action sooner, the next scheduled consideration on whether to revise, reaffirm, or withdraw Standard 137 is January 29, 2012. The next decision on Standard 137 should consider whether this standard should be revised to address the next generation of integrated heat pump designs. In the past, a few attendees have offered to serve on an eventual SPC, but no one has volunteered to chair the effort.

e. Web site

Darin Nutter

- i. The website is up to date.

10. Old Business

a. PECl Memo

- i. Matthew Tyler from PECl gave an update to the changes that are being proposed to Title 24. The changes are scheduled to take effect in 2013.
- ii. Modifications were made to the economizer requirements. Will email updated memo to committee
- iii. The last stakeholder meeting is in March and will be a webinar only.

11. New Business

a. Integrated Heat Pump Method of Test Proposal

- i. William Craddick asked the TC to endorse proceeding to the standards committee with a request to create a new MOT standard for Integrated Heat Pumps. The method of test would lay the groundwork to get the rating standard started at AHRI.
- ii. Don Schuster expressed concerned about grouping air source and water source equipment together. Craddick suggested that it could be split into two standards
- iii. AHRI Comments (Mike Woodford):

1. There is a problem with the proposed new standard's title, purpose, and scope (TPS) that is included on the TC8.11 agenda (see below and attached). The proposed Integrated Heat Pump Method of Test's TPS says it is to cover among other things, rating requirements. The "rating requirements" needs to be deleted per the AHRI and ASHRAE MOU. AHRI would write the rating standard. You should also make them aware that ASHRAE has a Standard 137-2009, MOT for Efficiency of Space-Conditioning/Water Heating Appliances that include a Desuperheater Water Heater, and that standard might suffice for some or all of what is proposed here. Also, AHRI used to have Std. 290-96, Air-Conditioning and Heat Pump Equipment Incorporating Potable Water Heating Devices, which we withdrew a while back, but which could be introduced to become active again if desired. It is a rating standard that referred to ASHRAE 147 for the MOT. There are several possible approaches here depending on what type(s) of equipment the proposer actually means, but main point is ASHRAE should do

only MOT and AHRI the rating standard. By the way, there is also an ASHRAE Standard 124 that covers the MOT for Rating Combination Space Heating and Water Heating Appliances.

iv. TC needed to vote to move forward to standards committee

1. Bill Murphy moved to support a request to form a project committee. Craig Messmer seconded.
2. Discussion
 - Don Schuster expressed concerned about grouping air source and water source equipment together. Craddick suggested that it could be split into two standards
 - AHRI has reviewed the proposal and would like to have the rating comment removed. Also feel that ASHRAE 137 would suffice. ASHRAE 124. Get AHRI comments from Aniruddh
 - Craig had concerns about not knowing what the products are since the CRADA limits what information is available.
 - Schuster felt the scope is too broad.
 - Uselton expressed concern that the standard writing process is slow and this would be an opportunity to get a head start. Byron agreed.
 - Robert Brown asked if an existing MOT could be modified to include these products.
 - Try to get co-sponsorship from TC 6.8, Geothermal Heat Pumps and Energy Recovery Applications
3. Vote was unanimous. 8-0-0
4. Committee has to vote on members
 - Suggested members: Dutch Uselton, Brian Doherty, Chris Stone, Aniruddh Roy, Wayne Reedy - Chair
 - Bill Murphy – Moved. Craig Messmer seconded Vote was unanimous 7-0-0

b. AEDG-K12 Peer Review – Advance Notice

12. Adjourn

- a. Schuster moved to adjourn. Vance Payne seconded.