

# TC 9.9 Meeting Minutes

Monday June 23, 2008  
Salt Lake City, UT, USA

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

TC/TG/TRG NO: **TC 9.9**      Date: **June 23, 2008**      Location: **Salt Lake City, UT, USA**

### TC/TG/TRG TITLE: **Mission Critical Facilities, Technology Spaces and Electronic Equipment**

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#### *General Meeting on June 23 - Call to order*

Roger Schmidt called the meeting to order at 2:00 p.m. The agenda was reviewed, also previewed the working group meetings scheduled for Tuesday.

Roger Schmidt introduced the incoming Chair and Vice Chair Fred Stack and Magnus Herrlin, respectively, and announced TC 9.9 is now the largest TC in ASHRAE.

Role Call – 8 out of 14 voting members were present.

#### *Attendees*

<b>Name</b>		<b>Company</b>
John	Bean	APC Corp.
Don	Beaty	DLB Associates
Christian	Belady	Microsoft Corp.
Harvey	Brickman	
Tahir	Cader	SprayCool
David	Copeland	Sun Microsystems
Craig	Crader	Brick Group
Tom	Davison	DLB Associates
Ecton	English	Department of Defense
Magnus	Herrlin	Ancis
Mark	Hydeman	Taylor Engineering
Gregory	Jeffers	
Rhonda	Johnson	
Geoff	Lawler	Stulz – ATS

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Bill	Maltz	
Douglas	McClellan	EYP MCF
Steve	McCluer	IEEE
David	Mess	Dell Corp.
Chris	Muller	Purafil
Shlomo	Novotny	Vette Corp.
Izuh	Obinelo	
Michael	Patterson	Intel
Rick	Paulak	Heapy Engineering
Bill	Pienta	Siemens
Richard	Pressley	
David	Roden	Vette Corp.
Terry	Rodgers	Syska
Jeff	Rutt	Department of Defense
Roger	Schmidt	IBM
Mike	Scofield	
Prabjit	Singh	IBM
Vali	Sorell	Syska
Jonathon	Spreeman	Trane
Fred	Stack	Emerson Network Power
Robin	Steinbrecher	Intel Corp.
Dave	Uden	Trane
Jay	Urbanski	IBM
Kushagra	Vaid	Microsoft Corp.
Herb	Villa	Rittal Corp.
Kathryn	Whitenack	Lytron Inc.
Gerald	Wyatt	Raytheon
John	Bean	APC Corp.
Don	Beaty	DLB Associates
Christian	Belady	Microsoft Corp.
Harvey	Brickman	
Tahir	Cader	SprayCool
David	Copeland	Sun Microsystems
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Michael	Patterson	Intel Corp.
Rick	Paulak	Heapy Engineering
Bill	Pienta	Siemens
Richard	Pressley	

## ***ASHRAE Overview***

The committee was visited by the TAC Chair and is asking everyone to review ASHRAE Strategic plan, TCs need a strategic plan and it should dovetail with ASHRAE Strategic Plan. Roger Schmidt was presented with a Certificate of Appreciation for his term as chair of TC 9.9.

## ***New York City Meeting Minutes***

Mark Hydeman made a motion to approve the New York meeting minutes. Mike Paterson 2<sup>nd</sup> the motion and it was 8-0. The minutes can be found on the TC 9.9 website: <http://www.tc99.ashraetcs.org>

## ***Programs Subcommittee Update***

**PROGRAM SUBCOMMITTEE REPORT** by Tom Davidson

**Review of current programs for Salt Lake City**

### **Transactions Session 7 (Intermediate) Modeling Data Center Airflow and Cooling Performance**

Monday, June 23, 9:45 a.m. - 10:45 a.m.

Track: Applications

Room I

*Sponsor: 4.10 Indoor Environmental Modeling; 9.9 Mission Critical Facilities, Technology Spaces and Electronic Equipment*

*Chair: H. Ezzat Khalifa, Member, Syracuse University, Syracuse, NY*

Sensitive electronics equipment housed in datacenters must receive sufficiently cool air to operate reliably. As datacenters are huge consumers of energy, there is great incentive to provide the required cooling as efficiently as possible despite unique facility and cooling architectures, continued rise of equipment power dissipation, large variations in power and airflow requirements among neighboring equipment, and the transient nature of computer workload. Predictions of datacenter airflow and cooling performance are needed to optimize datacenter architecture before initial build-out or equipment changes. This session addresses CFD and other novel computational techniques for modeling datacenters airflow and cooling.

1. Coarse-Grid CFD: The Effect of Grid Size on Data Center Modeling (SL-08-017)

James VanGilder, Member, Xuanhang Zhang, American Power Conversion, North Billerica, MA

2. Airflow and Cooling Performance of Data Centers: Two Performance Metrics (SL-08-018)

Magnus K. Herrlin, Ph.D., Member, ANCIS, San Francisco, CA

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## Seminar 46 (Basic)

### Panel of Existing Benchmarking and Metrics Affecting the Data Center

Tuesday, June 24, 9:45 a.m. – 10:45 a.m.

Track: Benchmarking

Room F

Sponsor: 9.9 Mission Critical Facilities, Technology Spaces and Electronic Equipment

Chair: Christian Belady, P.E., Associate Member, Microsoft, Redmond, WA

This panel of speakers provides an overview of various metrics that have emerged and will be deployed in data centers in the coming years.

Metrics for data center efficiency and server efficiency are highlighted by the following organizations: SPEC, EPA/DOE, The Green Grid and

Climate Savers. The attendees should get a good overview of metrics and benchmarks they should be considering.

1. Michael Patterson, Ph.D., P.E., Member, Intel, Hillsboro, OR – representing Climate Savers Computing Initiative
2. Tahir Cader, Ph.D., Spraycool, Liberty Lake, WA – representing The Green Grid
3. Kushagra Vaid, Microsoft, Redmond WA – representing SPEC
4. William Tschudi, P.E., Member, Lawrence Berkeley Laboratory, Berkeley, CA – representing the DOE

## Chicago

Note: Chicago papers were due for review by April 4, 2008

Chicago programs must be on-line submitted by August 8, 2008

Chicago meeting will take place from January 24 - 29, 2009

Theme: Sustainable urban design

### Chicago Transactions

ASHRAE Technical Committee 9.9 (Mission Critical Facilities, Technology Spaces and Electronic Equipment), is sponsoring a Transactions session for January 2009 ASHRAE Winter Meeting in Chicago, Illinois, and seeks papers for transaction session High Density Cooling Issues Update – January 2009. This transactions session will accept papers on a variety of issues that are pertinent to the cooling of high density data centers, telecommunications facilities, and combinations thereof. Issues of recent concern include planning for future data centers, site selection criteria and guidelines, development and use of value model to aid in site selection. Papers are due for review on ASHRAE's Manuscript Central by April 4, 2008.

Transactions chair/contact: [Jeffrey Rutt](#) 240-373-5790.

ASHRAE Technical Committee 9.9 (Mission Critical Facilities, Technology Spaces and Electronic Equipment), is sponsoring a Transactions session for January 2009 ASHRAE Winter Meeting in Chicago, Illinois, and seeks papers for transaction session Liquid Cooling Issues Update – January 2009. This transactions session will accept papers on a variety of issues that are pertinent to the cooling of high density data centers, telecommunications facilities, and combinations thereof. Issues of recent concern include lessons learned with recent liquid cooling products, reliability issues or best practices, and the return to liquid cooling and transitional technologies for cooling. Papers are due for review on ASHRAE's Manuscript Central by April 4, 2008. Transactions chair/contact: [Jeff Trower](#) 714-921-6010.

### Chicago Seminars

Kishor Khankari agreed to chair a seminar on Rack Cooling. This topic could potentially grow into a transaction, maybe for Louisville transactions. Both LBNL and Ronda Johnson stated they might be able to do presentations.

Mike Paterson agreed to chair a seminar on Sustainable Guidelines for the Data Center / Thermal Guidelines Update. Possible presentations include Standard 127, Sustainable Designs for the Future, LEED and 90.1 update.

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There was considerable discussion of the merits of both seminars and overall high interest in both.

## Chicago Forums

Herb Villa agreed to chair a forum to see if ASHRAE has an interest in a Rack Cooling Standard for open / closed architecture designs.

Tom Davidson made a motion to the Committee to prioritize the Chicago programs follows: Transactions (results depend on items submitted from the Call for Papers), sustainability seminar, rack cooling seminar and rack cooling standard forum. The motion was 2<sup>nd</sup> by Mike Paterson and passed 8-0.

## Louisville Program

Note: Louisville transactions papers are due for on-line review by September 26, 2008  
Louisville programs must be submitted on-line by February 6, 2009  
Louisville meeting will take place from June 20-24, 2009  
Theme: Optimal Air Quality Management

## Louisville Transactions Sessions

Gas Contaminants – Joe Prisco as possible chair

Free Cooling opportunities for data centers – Terry Rodgers as chair  
Possible authors include Vali Sorell, Bill Tschudi, Herb Villa, Mike Patterson, Andy Baxter

Liquid Cooled IT Equipment– Nick Gangemi/ Jeff Trower as chair  
There was discussion of definition – consensus was to use interface definition as defined in TC9.9's

Liquid Cooling Book  
Roger/ IBM could submit paper  
Mike Patterson & Fred Stack have some contacts

High Density 'catch all' John Bean as chair

We need to submit the Calls for Papers in the next few days to get them posted on ASHRAE websites and submitted to Insights

## Louisville Seminars

Christian: Case studies for ultra-efficient data centers  
Roger: we are doing a book on this theme [ Doug, UTC, Bank of Nebraska – fuel cells, Belgrade, unique technologies, Roger pulling book together at this point] Christian: successful transactions papers could be the basis for the this book.

Tom Davidson will be rolling off as program subcommittee chairperson and Vali Sorell will be the new program subcommittee chairperson.

Many Thanks to Tom for his dedicated and consistent work as PM chair!!!!

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## *Research Subcommittee Update*

### **RESEARCH SUBCOMMITTEE REPORT** by Robin Steinbrecher

Working to complete RTAR to research the relationship between ESD and humidity levels as soon as possible. Looking for committee vendors to donate equipment. Mark will send email to members asking for equipment "donations." The work team will need this list of equipment before RTAR can be finished.

The committee discussed a Work Statement 1487, "The Development of Simplified Rack Boundary Conditions for Numerical Data Center Models" from TC 4.10. They are requesting our support for the work statement. Tom Davidson made a motion for TC 9.9 to support this work statement. Dave Copeland 2<sup>nd</sup> the motion and it was passed 7-1.

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## *Handbook Subcommittee Update*

### **HANDBOOK SUBCOMMITTEE REPORT** by Doug McLellen

TC 9.9 is responsible for Applications Handbook, chapter 17. Chapter will need a thorough revision based new data in our books. The next hard bound publication is scheduled for 2011. CD comes out every year, and we try to get updates for the next CD submission due at the end of the Winter meeting. Lots of new information should be included in both hardcopy and CD version of the Handbook.

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## *Standards Subcommittee Committee*

### **STANDARDS SUBCOMMITTEE REPORT**

There are no actions required by the TC on Standards at this time.

Motion to support DOE and TC 9.9 on collaboration for data center course covering 3 books, **NYSER funded 5 workshops through out year**, ASHRAE agreed to provide books to attendees and presentation mats. Good opportunity for ASHRAE to get word out about data center cooling combined with DOE (LBNL); reviewed by green grid. Instructors will be qualified to train the workshop. Various venues such as Uptime Institute and, Utility companies will offer the workshop.

Mark Hydeman made a motion for TC 9.9 to endorse partnership between the committee and DOE to develop education program on efficiency measure, benchmarking for data centers. Vali Sorell 2<sup>nd</sup> the motion and was passed unanimously (8-0). The workshop will provide awareness training for the dc operator and provider on energy efficiency, benchmarking, cooling etc. The committee will review and approve the training materials. Although a general agreement already exists between DOE and ASHRAE, a separate memorandum of understanding or concurrence via email material put together in the next 2-3 months.

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## *Old Business*

The committee discussed the latest Environmental Envelop Recommendations form the IT vendors. The members wanted to review the entire document before voting on the entire document. However, Fred Stack made a motion to approve new expanded environmental condition box. The motion was 2<sup>nd</sup> by Mark Hydeman and was passed unanimously (8-0). It was noted that three of our books (Thermal Guidelines for Data Processing Environments, Best Practices for Datacom Efficiency and Design Considerations for

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Datacom Equipment Centers) would need to be updated, since they contain the original environmental envelope.

## *New Business*

Steve Comstock visited the TC to help determine how we can get our publications to the HVAC industry.

1. Environmental Envelope
  - a. News release, with a link to the ASHRAE website. Need info on why it's important and what/how developed. Needs to be copyrighted. Registration to download document. Put on front page of website for 2-3 weeks (**much like Advanced Energy Design Guidelines**). Steve said this is most preferred method. However, the Thermal Guidelines for Data Processing Environments, Best Practices for Datacom Efficiency and Design Considerations for Datacom Equipment Centers books needs to be updated. Will need to create a file for new book correction. Book inventory may determine how we update the existing inventory (see below for numbers). If someone buys the existing books, they need to get the new document. So do we print a hard copy and add it to existing books or do we provide a website link?
  - b. A Journal article was considered, but 11 pages a bit long. Steve agreed that the website news release was the best way to share the document.
  - c. We can send the document to our companies.
2. DOE/ASHRAE Workshop
  - a. Need agreement of understanding or exchange of emails concurring on this collaborative effort.
3. TC 9.9 Marketing Committee – Kathryn Whitenack Update
  - a. Purpose of Committee is “How to get our word out?”
  - b. Summary of book sales – Thermal Guidelines for Data Processing Environments, 3380 sold; Best Practices for Datacom Efficiency, 474 sold; and Design Considerations for Datacom Equipment Centers, 2086 sold.
  - c. Encourage companies spread the word.
  - d. Price based on page counts. Purchases from 10-99 receive a 50% discount, one book only, can't mix and match.
  - e. Could have you company logo on it for min 100 copies for \$250 setup fee.
  - f. Preparing 4 page brochures to be handed out at various trade shows, direct mail piece and workshops.
  - g. Press releases will occur when the books are translated into other languages.
4. Other marketing ideas from Steve
  - a. ASHRAE is considering an annual subscription fee for members to have access to the entire content of the Datacom Series.
  - b. One comment was ASHRAE could sell both electronic format and hardcopy for a combined price.
5. Green Tips book
  - a. Green Tips could be part of the website with link to purchase the Green Tips or Green Guide book.

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The next topic involved standards for temperature sensor on servers. It was decided that TC 9.9 should collaborate with Green Grid on sensor standards for servers, since they are already working on a standard. Tom from IBM is Green Grid POC. Fred Stack will schedule a one hour phone conference with him to understand what he's doing, his timeframe and status.

Roger brought up the air temperature rate of change for data centers. Many people are asking for further definitions. The location for this rate of change is at the inlet air temperature of the server. After much discussion, Magnus Herrlin stated he would provide additional documentation from NEBS on this topic and provide it to the committee membership to review.

Roger brought up a concern from one vendor regarding the pipe velocity. We need to be consistent with our books and ASHRAE piping design guidelines.

## *General Presentations*

PJ Sing provided a briefing on data center gaseous contamination. 300-400 volts in a dusty environment will cause arcing. Most think there is a problem with the power supply. Most contamination failures occur at the lower end of the rack because that is where the humidity level is the highest. Red or black deposits are iron and chloride debris from CRACs will cause problems. Sources of iron could come from pulleys or replacement belts that contain steel cording. OEM belts from all vendors do not contain steel. Salt can come from humidifier pans in CRAC units. More salt is produced from steam generated humidifiers than pan evaporators. As a rule of thumb most metals will corrode at 50%. Also, based on what contamination is in the data center. More research is needed. Chips are well protected in a hermetic environment and do not corrode. IEC and IAC industry controls may have lots of information on gaseous contamination.

It was agreed by the committee that this topic requires further research. Roger asked PJ Sing to prepare a work statement for the committee to review at the next meeting in Chicago.

## *Meeting Adjourned*

The Meeting was adjourned at 9:10 p.m.