Welcome!

Welcome to the ASHRAE TC 9.9 Virtual Meeting!

No need to say hello, we will begin promptly at 6:00 pm EST

Agenda

- Introduction
- Programs
- Research
- Publications

Housekeeping

Audio

- Attendees are muted upon entry
- Do not un-mute your line
- If you are joining via computer and phone line, ensure both are muted

Video

- We encourage you to keep your video off
- If you do enable your video, be mindful that you are on display! Turn off your video when needed.

Q&A

- Use the chat function to ask questions
- Our moderator will share questions throughout the presentation with the speaker to answer.
- If you need to speak, please use the Raise Hand button and the moderator will enable your microphone.

Attendance

- Please complete the attendance form found at the URL at the bottom of this slide

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment

ASHRAE Summer Conference 2023
Programs, Research, & Publication
Hybrid In-Person / Virtual

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

Virtual Meeting Etiquette

- Do not share your video due to the high number of virtual participants.
- Prior to speaking individuals should state their name so that others know who is speaking.
- Virtual participants should keep yourself muted unless giving permission to speak by the Host via chat.
- Please do not attempt to share your screen without being asked to do so by the Host or Co-Host.
- In-person participants are discouraged from joining the virtual meeting due to wireless bandwidth constraints.

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

Virtual Meeting Housekeeping

Virtual Host: Vice Chair - Matt Koukl

- Monitor the chat thread for questions and comments.
- Mute and Unmute Virtual Participants and Guests.
- Manage discussions and voting.
- Manage screensharing and in-person presentation

Virtual Co-Host: Secretary - Mark Steinke

- Monitor time and keep the meeting on schedule.
- Record the event.
- Produce meeting minutes.
- Will repeat the attendance link multiple times during the meeting and upon chat request.
- Respond to audio problems.

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

In Person Setup

- Video projector that displays the presentation being shared virtually.
- Be aware that chat comments sent to the Host may be seen by those in-person in addition to general chat comments.
- There are audio speakers in the room but unmuted virtual commentors may not be immediately connected. Please be patient.

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

Attendance

ASHRAE TC 9.9 Attendance Record

ASHRAE Technical Committee 9.9 - Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment
2023 Summer Meeting

Programs, Research, & Publications
Virtual Event Timing: Sunday June 25, 2023; 6:00-8:00 pm ET
Event Address: https://www.microsoft.com/microsoft-teams/join-a-meeting
Meeting ID: 275 911 663 998
Passcode: 26xton

Virtual Event Timing: Monday June 26, 2023; 2:30 - 7:00 pm ET
Event Address: https://www.microsoft.com/microsoft-teams/join-a-meeting
Meeting ID: 277 656 060 182
Passcode: ejXvUU

Contact us at tc99chair@gmail.com
Technical Committee Website: http://tc0909.ashraetcs.org

tc99chair@gmail.com Switch account

Not shared

* Indicates required question

Attendance is being recorded using a Google Form. Please make sure you complete the form at:

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Or use the QR Code below:

Agenda

Sunday, June 25, 2023
TC 9.9 Programs, Research, Handbook & Publications
6:00 PM – 8:00 PM EDT
Location: Tampa Marriott Waterside, Grand Salon ABC (2)

Microsoft Teams Meeting
https://www.microsoft.com/microsoft-teams/join-a-meeting
Meeting ID: 275 911 663 998
Passcode: 26xton

Attendance
https://forms.gle/TnV1uhvR2NLH2RxS7

Topic		Time	Presenter	In-Person or Virtual
Introduction	Welcome and Introductions	10	John Groenewold	IP
Programs	2023 Summer Tampa & 2024 Winter Chicago	10	Eric Yang	IP
Handbook	Handbook Update	10	Robert McFarlane	IP
Publications	Publications Update	20	Don Beaty	IP
Publications	Publications Workshop - Online Datacom Service	60	Don Beaty	IP
	Total Time:	110	Minutes	

Programs Update

ASHRAE 2023 Annual Meeting
June 24-June 28, 2023

Eric Yang, Program Chair

MAY 2023

Developing Economies Conference 2023
May 11-12, 2023| Mumbai, India

SEPT 2023

2023 Building Performance Analysis Conference
September 11-13, 2023| Austin, TX

OCT 2023

2023 Decarbonization Conference for the Built Environment
October 25-27, 2023| Washington, DC

2023 ASHRAE Annual Conference
June 24-28, 2023 | Tampa, FL

ashrae.org/conferences

ASHRAE Annual Conference-Tampa

Conference Sponsored by TC 9.9

Panel 1: Future Data Center: Road Map to Liquid Cooling Facility Design and Implementation and Operation - Chair: John Groenewold
Time: June 25 11:00 AM – 12:30 PM EDT Sunday

Seminar 34: The Impact of Hot and Humid and Corrosive Environment on Data Center Equipment: Recent Research Activities on Data Centers – Chair: Eric Yang
Time: June 26 11:00 AM – 12:00 PM EDT Monday

Seminar 62: Coupling Simulation Tools for Fast and Accurate Indoor Environmental Models for Assessing Potential Energy Impacts of System Design and Operation
Time: June 28 9:45 AM – 10:45 AM EDT Wednesday -Chair: Liang Chung Lo (TC4.10, TC9.9)

Seminar 67: Blockchain and the HVAC Industry: It's Not All About Cryptocurrencies
Time:, June 28 11:00 AM – 12:30 PM EDT Wednesday –Chair: Stephen Roth (TC9.9 , TC1.5,)

Overview of Conference Tracks:

- **Tracks**
  - **HVAC&R Fundamentals and Applications**
  - **Systems and Equipment**
  - **Refrigeration & Refrigerants**
  - **Decarbonization & Climate Change**
  - **Hydronic Systems**
  - **Ventilation, Indoor Air Quality and Air Distribution System**
  - **Comfort, Indoor Environmental Quality and Energy Efficiency**
  - **HVAC&R Control**
  - **Project Delivery Methods**

Important Dates –Chicago

Wednesday, August 2, 2023 | Debate, Panel, Seminar, Forum, Workshop, and Debate Proposals Due

Program Types

- **Require Learning Objectives, Q&A**
- **Seminars**:
  - Feature presentations on subjects of current interest.
  - No papers attached to seminars.
- **Workshops**:
  - Provide a series of short presentations on a topic requiring specific expertise.
  - Have an increased emphasis on audience participation and training in a specific set of skills.

Program Types

Do not require Learning Objectives, Q&A

Panel Discussion

- Feature a broad range of subjects and explore different perspectives on industry related topics.
- This session format includes a panel of 3-6 speakers each addressing a facet of the session topic, followed by an interactive discussion lead by the session chair.

Debates

- Highlight hot-button issues commonly faced by ASHRAE members. Industry experts, either on teams or as individuals, argue opposing sides of an issue, concluding with position summaries and audience feedback.

Forums

- “Off-the-record” discussed held to promote a free exchange of ideas.
- Allow individuals to speak confidentially without concern of criticism.
- There are no papers attached to forums.

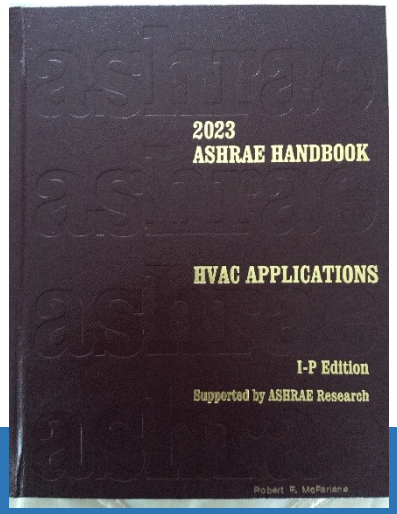
Next Step

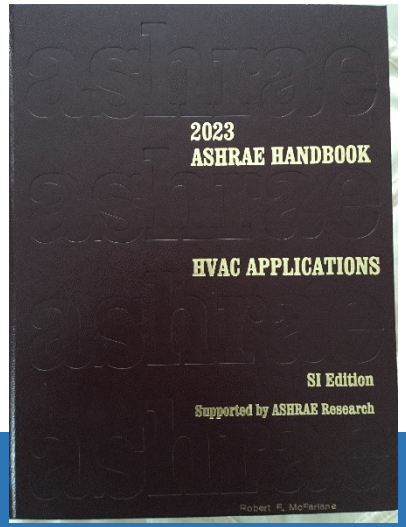
- **Maintain a current program idea list**
- **Contact me if you need to co-sponsorship from other TCs or other helps.**
- **Contact Eric Yang (ericyangcem@gmail.com)**

Chapter 20

"Data Centers & Telecommunication Facilities"

2023 Update





UPDATE

- 2023 “Applications” Handbook
- TC9.9 Responsible for Chapter 20
- Revision Due Date: June 2022 Summer Meeting
- Approved by TC Board June 17, 2022

Draft Revisions Were Completed April 1, 2022

REVIEW PLAN

- Each Topic in Each Chapter Section Has Been Reviewed
- 33 Authors & Reviewers Volunteered
  - All Drafts and Edits Were Completed On-Time
  - Don Beaty Did “Final Edit Review
    - Several Important Suggestions
  - TC 9.9 Board Reviewed & Made 3 Edits
  - Final Draft & “Chapter Approval Checklist” Submitted 6/22/22

CONTRIBUTORS

PRIMARY WRITERS

Gerardo Alfonso
Don Beaty
Thomas A. Davidson
Daniel N. Donahoe
Dustin W. Demetriou
Mark Fisher
John Gross
John Groenewold
Ali Heydari
Phil Isaak
Dave Kelley
Robert E. McFarlane
Christopher O. Muller
Budy Notohardjono
Shlomo Novotny
Gokhan Pekcan
Benjamin Petschke
Terry L. Rodgers
Roger R. Schmidt
Vali Sorell
Jeff Trower

REVISORS & VIEWERS

Seth Bard
Cibi Chakravarthy
Jainish Gandhi
Ed Gutowski
Michael Hathorne
Denis Hellmer
Jonathon Jew
Sushil Kumar
Dave Meadows
Rick Pavlak
David Quirk
Mark Seymore

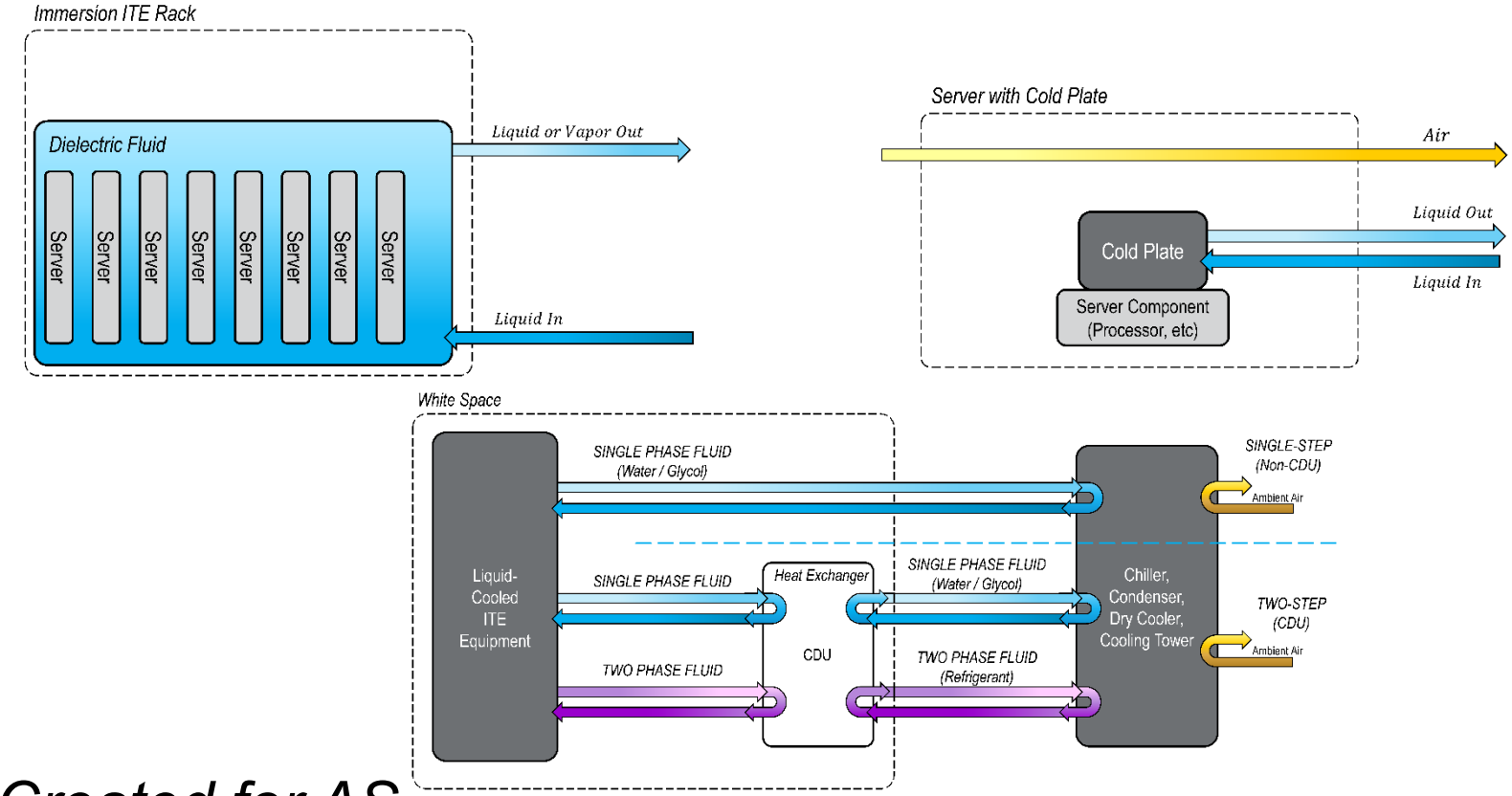
WHAT DID WE CHANGE?

- "*Air Distribution*" Presently Divided Into:
  - *Underfloor Air Delivery*
  - *Overhead Air Delivery*
- Changed To:
  - *Underfloor Air Delivery*
  - *Non-Raised Floor Air Delivery* to Incorporate:
    - Overhead Air Systems
    - In-Row Cooling
    - Side Wall Air Delivery

WHAT DID WE CHANGE?

- Expanded "*Data Center Economizer*" Section
  - *Excellent New Illustrations by Mark Fisher*
  - *Discovered Economizers Not Really Covered in Any Handbooks!!*
- Added "*Data Center Commissioning*"
- Updated "*Thermal Envelope*" to 5th Edition Numbers
  - *Discovered Omission in 5th Edition – Now Corrected by Addendum*
- *Massive Re-Wording & Syntax Improvements*
- *Moved All "*Datacom Book Series*" Descriptions to "References"*

NEW ILLUSTRATION EXAMPLES



Created for ASHAE by Mark Fisher

One "Errata" in SI Edition

A4	5 to 45	–12°C dp and 8% rh to 24°C dp and 90% rh	24	3050	5/20	5 to 45	8 to 80
H1[o]	5 to 25	–12°C dp and 8% rh to 17°C dp and 80% rh	17	3050	5/20	5 to 45	8 to 80

Note: For potentially greater energy savings, refer to Appendix C of ASHRAE (2021) for the process needed to account for multiple server metrics that impact overall total cost of ownership (TCO).

[a]Classes A3, A4, are identical to those in the 2011 edition of *Thermal Guidelines for Data Processing Environments*. The 2015 version of the A1 and A2 classes have expanded relative humidity levels compared to the 2011 version.

[b]Product equipment is powered on.

[c]Tape products require a stable and more restrictive environment (similar to Class A1). Typical requirements: temperature between 15°C and 32°C, relative humidity between 20 and 80%, maximum dew point 22°C, rate of change of temperature less than 5 °C/h, rate of change of humidity less than 5% rh per hour, and no condensation.

[d]Product equipment is removed from original shipping container and installed but not in use (e.g., during repair, maintenance, or upgrade).

[e]**Classes A1, A2:** Derate maximum allowable dry-bulb temperature 1 °C/300 m above 900 m. Above 2400 m altitude, derated dry-bulb temperature takes precedence over recommended temperature. **Class A3:** Derate maximum allowable dry-bulb temperature 1 °C/175 m above 900 m. **Class A4:** Derate maximum allowable dry-bulb temperature 1 °C/125 m above 900 m.

[f]**For tape storage:** 5 °C in an hour. **For all other ITE:** 20 °C in an hour and no more than 5 °C in any 15 min period of time. Temperature change of ITE must meet limits shown in table, and is calculated as maximum air inlet temperature minus minimum air inlet temperature within specified time window. The 5 and 20 °C temperature change is considered to be a temperature change within a specified period of time and not a rate of change. See Appendix K of ASHRAE (2021) for additional information and examples.

[g]With diskette in drive, minimum temperature is 10°C (not applicable to Classes A1 or A2).

[h]Minimum humidity level for Classes A1, A2, A3, and A4 is the higher (more moisture) of the –12°C dew point and the 8% rh. These intersect at approximately 25°C. Below this intersection, the dew point represents the minimum moisture level, whereas above it, the relative humidity is the minimum.

[i]Based on ASHRAE research and performed at low relative humidity, minimum requirements are

1. Datacom facilities with non-ESD floors and where people are allowed to wear non-ESD shoes may want to consider increasing humidity, given that the risk of generating 8 kV increases slightly from 0.27% at 25% rh to 0.43% at 8% (see Appendix D of ASHRAE [2015a] for details).
2. All mobile furnishing/equipment must be made of conductive or static dissipative materials and bonded to ground.
3. During maintenance on any hardware, a properly functioning and grounded wrist strap must be used by any personnel who contacts ITE.

[j]To accommodate rounding when converting between SI and I-P units, maximum elevation is considered to have a variation of ±0.1%. The effect on ITE thermal performance in this variation range is negligible and allows use of rounded values of 3050 m. Operation above 3050 m requires consultation with IT supplier for each specific piece of equipment.

[k]See Appendix L of ASHRAE (2021) for graphs showing how maximum and minimum dew-point limits restrict the stated relative humidity range for each class for both product operations and product power off.

THANK YOU TO ALL !!!

- QUESTIONS?

Agenda

Monday, June 26, 2023
2:30 – 7:00 pm ET
TC 9.9 Main Meeting, IT & Publications

Microsoft Teams Meeting
Meeting ID: 277 656 060 182
Passcode: ejXvUU

Attendance: https://forms.gle/TnV1uhvR2NLH2RxS7

Thank You

TC 9.9 Website:
tc0909.ashraetcs.org

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Or use the QR Code below:

Subcommittee Meetings

Research Subcommittee Meeting will continue on this Team's meeting.

Publications Subcommittee Meeting will be starting on the following teams meeting at 7 pm ET:

Teams Meeting Meeting ID: 279 451 360 874 / Passcode: Fisfom