



Draft Minutes

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

ASHRAE TC 4.7 Energy Calculations - Main Meeting

2/11/2025 Orlando Winter Meeting

4-6:30 PM ET

Hybrid: Hilton Orlando, Lake Concord AB (Lobby Level) onsite, Link below for online

Chair: Hyojin Kim (hyojin.kim@njit.edu)

[MOTION]

1. Pruettt moves to approve Orlando Agenda. Taylor seconds. Approved 8-0-0 CNV.
2. Pruettt moves to approve Indianapolis Minutes. Taylor seconds. Approved 8-0-0 CNV.
3. Neymark moves to adjourn. Pruettt seconds. Approved 8-0-0 CNV.

[ACTION]

1. J.C. Baltazar will contact the ISO TC 163 for potential TC 4.7 participation.
2. Jeff Haberl and Ralph Muehleisen get together for historical papers of the TC 4.7 group.

JOIN MEETING REMOTELY

[https://teams.microsoft.com/l/meetup-](https://teams.microsoft.com/l/meetup-join/19%3ameeting_MTY3YTQzNWUtYTkxZC00MTZmLTgyNDAtNGYxYzcxOTQzNTM4%40thread.v2/0?context=%7b%22id%22%3a%220cfca185-25f7-49e3-8ae7-704d5326e285%22%2c%22oid%22%3a%22f7c57e31-4772-40b2-8487-e1874634f92a%22%7d)

[join/19%3ameeting_MTY3YTQzNWUtYTkxZC00MTZmLTgyNDAtNGYxYzcxOTQzNTM4%40thread.v2/0?context=%7b%22id%22%3a%220cfca185-25f7-49e3-8ae7-704d5326e285%22%2c%22oid%22%3a%22f7c57e31-4772-40b2-8487-e1874634f92a%22%7d](https://teams.microsoft.com/l/meetup-join/19%3ameeting_MTY3YTQzNWUtYTkxZC00MTZmLTgyNDAtNGYxYzcxOTQzNTM4%40thread.v2/0?context=%7b%22id%22%3a%220cfca185-25f7-49e3-8ae7-704d5326e285%22%2c%22oid%22%3a%22f7c57e31-4772-40b2-8487-e1874634f92a%22%7d)

[4:00 \[15 min\] Call to Order, Introductions & Welcome to New Attendees \(H. Kim\)](#)

[4:15 \[1 min\] Review Code of Ethics Commitment \(H. Kim\)](#)

[4:16 \[4 min\] Call of Voting Members \(Pruett\)](#)

[4:20 \[5 min\] Approve Agenda & Past Minutes \(H. Kim\)](#)

[4:25 \[5 min\] Announcements/Liaisons \(H. Kim\)](#)

[4:30 \[5 min\] TC 4.7 Title & Scope Update \(H. Kim\)](#)

[4:35 \[2 min\] Basecamp \(H. Kim\)](#)

[4:37 \[5 min\] Membership \(H. Kim\)](#)

[4:42 \[8 min\] Website \(Fine\)](#)

[4:50 \[65 min\] Subcommittee Reports](#)

[4:50 \[15 min\] Standards \(Neymark\)](#)

[5:05 \[5 min\] Honors, Awards, and History \(Muehleisen\)](#)

[5:10 \[5 min\] Handbook \(Baltazar\)](#)

[5:15 \[10 min\] Program \(J. Kim\)](#)

[5:25 \[10 min\] Research \(McDowell\)](#)

[5:35 \[10 min\] Physics-Based Modeling \(Judkoff\)](#)

[5:45 \[10 min\] Data-Driven Modeling \(Sharma\)](#)

[5:55 \[10 min\] Related Activities Reports](#)

[6:05 \[15 min\] New Business](#)

[6:20 Adjourn](#)

[Appendix A: Upcoming Meetings](#)

[Appendix B: Resources](#)

[Appendix C: Future Program Tracks](#)

4:00 [15 min] Call to Order, Introductions & Welcome to New Attendees (H. Kim)

- Hyojin Kim, Chair
- John Pruett, Vice-Chair
- Juan Carlos Baltazar, Secretary
- Juan Carlos Baltazar, Handbook Chair
- Jeannie Kim, Program Chair
- Tim McDowell, Research Chair
- Joel Neymark, Standards Chair
- Jamie Fine, Webmaster
- Ron Judkoff, Physics-Based Modeling (PBM) Subcommittee Chair
- Himanshu Sharma, Data-Driven Modeling (DDM) Subcommittee Chair
- Ralph Muehleisen, Honors, Awards, and History Subcommittee Chair
- Ralph Muehleisen, Web/Hybrid Meeting Guru

Meeting started at 4:00pm by Kim.

4:15 [1 min] Review Code of Ethics Commitment (H. Kim)

In ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and shall avoid all real or perceived conflicts of interest. Our culture is one of inclusiveness, acknowledging the inherent value and dignity of each individual. We celebrate diverse and inclusive communities, understanding that doing so fuels better, more creative and more thoughtful ideas, solutions and strategies for the Society and the communities our Society serves. We respect and welcome all. (See full Code of Ethics: <https://www.ashrae.org/about/governance/code-of-ethics>)

4:16 [4 min] Call of Voting Members (Pruett)

Present?	Last	First	Term Ends	Company	Email
X-Remote	Miller	Clayton	2025	Nat. U. of Singapore	clayton@nus.edu.sg
X	Baltazar	Juan Carlos	2028	Texas A&M University	juan-carlosbaltazar@tamu.edu
X	DeGraw	Jason	2027	ORNL	jason.degraw@gmail.com
X-Remote	Fontanini	Anthony	2026	NREL	anthony.fontanini@nrel.gov
X-Remote	Kim	Hyojin	2026	NJIT	hyojin.kim@njit.edu
X-Remote	Kim	Jeannie	2027	Argonne National Lab	jihyun.kim@anl.gov
X	Neymark	Joel	2028	J. Neymark & Associates	neymarkj@msn.com
X	Pruett	John	2026	ZMM	jap@zmm.com
X	Taylor	Russell	2028	Carrier	rdt.vma131@gmail.com

4:20 [5 min] Approve Agenda & Past Minutes (H. Kim)

[2024 Indianapolis Annual Minutes](#)

[Motion 1] Pruettt moves to approve Orlando Agenda. Taylor seconds. Approved 8-0-0 CNV.

[Motion 2] Pruettt moves to approve Indianapolis Minutes. Taylor seconds. Approved 8-0-0 CNV.

4:25 [5 min] Announcements/Liaisons (H. Kim)

- Electronic ballot results (August 12 to 16) for the approval of the final report of ASHRAE RP-1815 "Integrating Occupant Behavior Data into Building Information Models for Performance Simulation": Moved by H. Kim, seconded by Neymark, and approved with a vote of 7-0-0-1-CNV (In favor - Against - Abstaining - Not Present).
- TAC Section 4 (Kyle Gluesenkamp)
[Took over for Patrick Marks](#)
[Rosters need to be updated soon](#)
[Activity Form needs to be submitted right after TC meeting.](#)
- Research (Dennis Landsberg)
[Dennis stated that funding is becoming available again for research.](#)
- Handbook (Bob McFarlane)

TC Chair Breakfast:

1. [YEA Mentor program looking for volunteers for Annual Conference in Phoenix.](#)
2. [10 tentative tracks announced for 2026 Winter Conference in Las Vegas.](#)
3. [Government Affairs is always in need of Subject Matter Experts \(SMEs\).](#)
4. [ISO TC163 Thermal Performance and Energy Use in the Built Environment needs TC4.7 involvement on SC2 Calculation Methods. Any time there is an international vote, the U.S. has to abstain.](#)
[\[Action 1\] – J.C. Baltazar will contact the ISO TC 163 for potential TC 4.7 participation.](#)

4:30 [5 min] TC 4.7 Title & Scope Update (H. Kim)

- As approved by TC 4.7 at the 2024 Chicago Winter Meeting:
 - Title: TC 4.7 Building Performance Modeling
 - Scope: TC 4.7 identifies, evaluates, develops, and recommends procedures for calculating performance of the built environment, including energy, emissions, and economics.
- Revised scope at the 2024 Indianapolis Annual Meeting (no voting conducted):
 - Scope: TC 4.7 identifies, evaluates, develops, and recommends procedures for calculating energy and environmental performance of the built environment.
- Coordination with TC 7.6 per TAC's suggestion:
 - TC 7.6 has shared concerns about potential overlap and similar wording.
 - [Outcome from the leadership meeting with TC 7.6 on August 27, 2024]: TC 7.6 will address a potential title/scope change for their TC, and further discussion will be

postponed until their deliberations are received. So this will be revisited on the annual ASHRAE meeting in Phoenix, AZ meeting.

4:35 [2 min] Basecamp (H. Kim)

All correspondence through [Basecamp](#). Copyrighted materials (e.g., Handbook chapter drafts or committee roster) are posted for member use only. Contact Chair to be added.

4:37 [5 min] Membership (H. Kim)

- Changes in TC 4.7 Leadership
 - Honors, Awards, and History: Haberl → Muehleisen
 - Program: Kastl → J. Kim
 - Webmaster: J. Kim → Fine
 - DDM: McNeill → Sharma
 - Handbook: Baltazar → Hong (July 2025)
- Voting Members
 - Voting Members:
 - Miller (Non-Quorum) rolling off in June 2025
- Corresponding Membership
 - Attendance sheet has been updated:
 - “Not on Roster”, you have not applied to join the TC (or name on attendance sheet doesn’t align with the roster)
 - If you’ve been attending regularly, and would like to be promoted to CM, indicate on the attendance sheet, or contact the Chair

4:42 [8 min] Website (Fine)

<http://tc0407.ashraetcs.org/>

Website has been updated with all agendas and meeting minutes. Membership link is solely controlled by ASHRAE. Home page lists meeting information and general information about TC4.7 and how to join.

4:50 [65 min] Subcommittee Reports

4:50 [15 min] Standards (Neymark)

- 140-2023: Method of Test for Evaluating Building Performance Simulation Software (McDowell)
[McDowell reporting \[description of std from previous meetings\]](#)
 - 140 is collection of test suites that function as a “P.E. exam” (core competency tests) for software along with acceptance criteria for a subset of cases. The test suites cover commonly modeled aspects of building thermal fabric and HVAC equipment.

- Extended time-series acceptance criteria based on selected daily hourly outputs from the thermal fabric [Section 7] tests: Addendum for this planned for Publication/Public Review (P/PR) vote soon [likely via letter ballot]
- Good progress on ETNA empirical validation tests after 4th round of field trials. Development of 140 addendum materials is in progress, planning to submit for P/PR vote this Spring.
- Field trials on Energy Efficiency Measure (EEM) modeling tests
- Software-to-software comparative tests for building types applied in Standard 90.1, beginning with medium office building
- Field trials begun last Autumn led by PNNL project team.
- Spec comments received by trial participants, and PNNL addressing spec updates based on the comments.

[Reported from previous meetings or other updates by Stds SubC Chair]

- Standard 140 (including Acceptance Criteria) promulgation (Glazer, McDowell)
- 90.1 ECB: 90.1 Addendum at to Stds C this meeting for publication approval. If approved, publication by ASHRAE expected in coming months.
- There also references of 140-2023 by IECC, CEC (Title 24), NECB (Canada) in various stages of progress.
- IBPSA-US National BEM Certification Portal is live;
<https://www.ibpsa.us/resources/national-bem-certification-program/>

[Reported with IBPSA-World activities]

IBPSA Standards Committee (Crawley)

- IBPSA co-sponsors all above standards
 - 205-2023 Addendum d approved Jan 9, 2025
 - Addendum d to Standard 205-2023 generalizes the RS0001 representation specification to cover liquid-cooled, air-cooled, and evaporatively cooled chillers.
 - Publication approval of ASHRAE Std 232
 - Approval of 5 Std 209 addenda
- 205-2023 (ANSI/ASHRAE): Representation of Performance Data for HVAC&R and Other Facility Equipment
(Barnaby/Kruis) – Barnaby reporting
 - Objective is to adapt machine readable schema information from a common base source; this promotes consistency of data content/format.
 - Emphasis is applying performance maps to models, rather than on performance curves
 - Currently has standardized data models for water-cooled chillers, DX refrigeration, electric, fans, motors and drives, etc (there are 7 equipment types total)
 - 2 addenda in progress: Chillers; and including heating to DX coil performance (for heat pumps)
 - Also work in progress: cooling towers, heat recovery ventilation, and means for open-source software developers to exploit (apply) schema
 - 209-2018 (ANSI/ASHRAE/IBPSA): Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings
(Glazer/Crawley/Kolderup) – Neymark reporting

- PC reformed in 2021 as SSPC: 40+ members (VMs and NVMs)
 - 13 topical Working Groups (e.g., facades, quality assurance, etc)
 - **209-2024 new continuous maintenance revision published November 2024**
- 229P: Protocols for Evaluating Ruleset Application in Building Performance Models (Goel/Glazer) – Kruis reporting
 - PNNL developing a checking tool for 90.1-2019 modeling, intended to be updated as rule bases change (e.g., for baseline and proposed models)
 - The standard defines a schema that can be read for the purpose of ruleset checking
 - Working groups for: schema ruleset model report (RMR); ruleset checking; terminology
 - Progress: Absorbing comments from 1st P/PR
 - ☆ Planning 2nd P/PR will be a full public review of the standard
 - 232 P (ASHRAE/IBPSA): Common Content and Specifications for Building Data Schemas (McDowell)
 - McDowell reporting
 - Defines data structures (rules) and conventions that would be used for BPS models, but not defining data models themselves. This draws/evolved from 205 and 229, both of which are describing data models. 232 implies a single method for how to describe data models.
 - Areas of focus include time-series and time-stamp schema
 - Published Autumn 2024
 - PC voted to become an SSPC; to submit applications for that in February.

5:05 [5 min] Honors, Awards, and History (Muehleisen)

[Service to ASHRAE Research Award:](#)
[George B. Hightower Technical Achievement Award](#)

5:10 [5 min] Handbook (Baltazar)

The Chapter 19 of 2025 was approved in the previous annual meeting was submitted to the ASHRAE Publication Portal. The review procedure will be completed on this spring and the handbook committee informed that we will provide opportunity for examination before printing the chapter.

5:15 [10 min] Program (J. Kim)

3 programs submitted for Orlando, 2 accepted.
 Submissions for Phoenix due February 26.
 Website for 2026 Winter Conference in Las Vegas will post about February 19. Tentative submission dates will be set at that time.

5:25 [10 min] Research (McDowell)

\$3.9 million budget this year.

RAC has reviewed 0 RTARS and 8 work statements this year.

All approved work statements are going out for bidding.

RPs in progress:

1661: Completed Awaiting final submission of 1 form (by Kruis)

1815: Finished it the past year. Final Report was approved on August 2024.

1816: In progress

1857: Started on December 2024, so far two meetings are occurred. Data set should be completed before next meeting.

5:35 [10 min] Physics-Based Modeling (Judkoff)

26 attendees

HVAC Toolkits – volume 3 was identified. Plan to move the three of the toolkits to Github.

It is planned to make them available thru ASHRAE

5:45 [10 min] Data-Driven Modeling (Sharma)

Meeting was carried out normally after the leadership change.

5:55 [10 min] Related Activities Reports

- TC 4.1: Load Calculation Data and Procedures
 - It was mentioned that Mr. Pegues proposed to change the organization of the TC 4.1 chapters.
 - Changing the model for load to include a profile for design day
- TC 4.2: Climatic Information
 - There is more activity on future weather files development and that NCEI will change the weather availability procedure.
- Other TCs?
 - TC 4.5 Fenestration: Shading systems are completed
- Standard 90.1: Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings
 - [Kruis] Proposed new performance factors for 2025 – no approved yet
- Guideline 14: Measurement of Energy, Demand and Water Savings
 - Started together in the past Fall, the new chair is Jeff Haberl and Dennis Landsberg is the vice-chair.
- Other Standards/Guidelines?
- MTG.RES (DeGraw)
 - No update
- IBPSA-USA
 - There are several funded projects.
 - Updated the BEMP training materials.
 - IBPSA-USA Software Certification Web Portal (sroth@camelsoft.com), a web-based software certification program for software tools meeting the requirements of:

1. ASHRAE Standard 90.1: Chapter 11 – Energy Cost Budget Method (ECB)
 2. ASHRAE Standard 90.1: Appendix G – Performance Rating Method (PRM)
 3. ASHRAE Standard 140-2023 with acceptance criteria
- IBPSA-World
 - Standards participation of five of them (232-Addenda, 205 Addenda, 209- Addenda, ...)
 - CalBEM
 - Three working groups: Education, State of Technology
 - Webinars (Spring & Summer) for compliance
 - Modelica North America
 - ASHRAE Conference for Integrated Design, Construction & Operations (CIDCO)
 - Others?

6:05 [15 min] New Business

[Action 2] Jeff Haberl and Ralph Muehleisen get together for historical papers of the TC 4.7 group.

6:20 Adjourn

[Motion 3] Neymark moves to adjourn. Pruetts seconds. Approved 8-0-0 CNV.

Appendix A: Upcoming Meetings

- June 21 to 25, 2025 – Phoenix, AZ
- Jan. 31 to Feb. 4, 2026 – Las Vegas, NV
- June 27 to July 1, 2026 – Austin, TX

Appendix B: Resources

- ASHRAE's Research Proposal Process:
 - <https://www.ashrae.org/file%20library/technical%20resources/research/ashrae-research-flowchart-r6.pdf>
- ASHRAE Acronym Guide:
 - https://www.ashrae.org/file%20library/about/marketing/final_ashrae-acronyms.pdf
 - Common Acronyms:
 - Research:
 - RTAR: Research Topic Acceptance Request
 - PTAR: Publication Topic Acceptance Request
 - WS: Work Statement
 - RP: Research Project
 - RAC: Research Administration Committee
 - Program:
 - CEC: Conferences and Expositions Committee
 - Standards:
 - SPC: Standard Project Committee
 - SSPC: Standing Standard Project Committee
 - SPLS: Standards Project Liaison Subcommittee (of Standards Committee)
 - MOP: Manual of Procedures
 - SH: Section Head
 - YEA: Young Engineers in ASHRAE
- 4.7 Committee Home Page:
 - <http://tc0407.ashraetcs.org/>
- 4.7 BaseCamp Page:
 - <https://3.basecamp.com/3106353/projects/8174587>

Appendix C: Future Program Tracks

- June 21 to 25, 2025 – Phoenix, AZ: <https://www.ashrae.org/conferences/2025-annual-conference-phoenix/2025-annual-conference-technical-program>
- Wednesday, February 26, 2025 | Debate, Panel, Seminar, Forum, Workshop, and Debate Proposals Due
- The Conferences and Expositions Committee requests that proposed program submissions for conference technical programs consider ASHRAE's commitment to Diversity, Equity and Inclusion when selecting speakers for programs.