



Draft Agenda

ASHRAE TC 4.7 Energy Calculations - Main Meeting

2/7/2023 Atlanta Winter Meeting

4-6:30 PM ET

Hybrid: Omni CNN Center Atlanta, Chestnut (M3-North) onsite,

Link below for online

Chair: Neal Kruis (neal.kruis@bigladdersoftware.com)

[MOTION]

1. **Crawley moves to approve meeting minutes from Toronto. Pruett seconds. Approved 4-0-0 CNV.**
2. **Pruett moves to approve report for RP1661. Kim seconds. Passes 4-0-0 CNV.**
3. **Fontanini moved to adjourn. H. Kim seconded.**

[ACTION]

1. **Dru Crawley to head working group to potentially update TC4.7 title.**

Connection Instructions

Call to Order & Introductions (10 min, Kruis) 4:00

Review Code of Ethics Commitment (1 min, Kruis) 4:10

Call of Voting Members (3 min, H. Kim) 4:11

Accept agenda & approve 2022 Summer meeting minutes (2 min, Kruis) 4:14

Review TC 4.7 Title & Scope (4 min Kruis) 4:16

Basecamp (5 min, Kruis) 4:20

Membership (10 min, Kruis) 4:25

Announcements/Liaisons (10 min, Kruis) 4:35

Subcommittee Reports (62 min) 4:45

Standards (15 min, Neymark) 4:45

Honors, Awards, and History (5 min, Haberl) 5:00

Website (2 min, J. Kim) 5:05

Handbook (5 min, Baltazar) 5:07

Program (10 min, Kastl) 5:12

Research (10 min, McDowell) 5:22

Simulation and Component Models (5 min, Ball) 5:32

Data-Driven Modeling (5 min, Smith) 5:37

Multiscale Building Energy Modeling (5 min, Judkoff) 5:42

[Related Activities Reports \(15 min\) 5:47](#)

[New Business \(5 min\) 6:02](#)

[Adjourn \(H. Kim\) 6:07](#)

[Executive Session \(H. Kim, 15 min\) 6:12](#)

[Appendix A: Upcoming Meetings](#)

[Appendix B: Resources](#)

Connection Instructions

JOIN WEBEX MEETING

<https://ashrae.webex.com/ashrae/j.php?MTID=m205c772a35ee04d39a78f5502893d3ff>

Call to Order & Introductions (10 min, Kruis) 4:00

- Neal Kruis, Chair
- Hyojin Kim, Vice-Chair
- John Pruett, Secretary
- Juan Carlos Baltazar, Handbook Chair
- Brian Kastl, Program Chair
- Tim McDowell, Research Chair
- Joel Neymark, Standards Chair
- Jeannie Kim, Webmaster
- Ron Judkoff, Multi-scale Building Modeling Subcommittee Chair
- Amanda Smith, Data-driven Modeling Subcommittee Chair
- Brian Ball, Simulation and Component Models Subcommittee Chair

Review Code of Ethics Commitment (1 min, Kruis) 4:10

In this and all other 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 we shall avoid all real or perceived conflicts of interests.

Call of Voting Members (3 min, H. Kim) 4:11

5 VMs: Quorum achieved.

Present?	Last	First	Term Ends	Company	Email

	Miller	Clayton	2025	Nat. U. of Singapore	clayton@nus.edu.sg
x	Crawley	Dru	2024	Bently	dru.crawley@bentley.com
x	Fontanini	Anthony	2026	NREL	anthony.fontanini@nrel.gov
X - Arrived late	Haberl	Jeff	2024	Texas A&M	jhaberl@tamu.edu
x	Kim	Hyojin	2026	NJIT	hyojin.kim@njit.edu
x	Kruis	Neal	2024	Big Ladder	neal.kruis@bigladdersoftware.com
x	Pruett	John	2026	ZMM	jap@zmm.com
	Rao	Sagar	2023	AEI	sagar.rao@outlook.com
	Wang	Liping	2025	U. of Wyoming	lwang12@uwyo.edu

Accept agenda & approve 2022 Summer meeting minutes (2 min, Kruis) 4:14

[Motion 1] Crawley moves to approve. Pruett seconds. Approved 4-0-0 CNV

Review TC 4.7 Title & Scope (4 min Kruis) 4:16

Title: TC 4.7 Energy Calculations

Scope: TC 4.7 identifies, evaluates, develops, and recommends procedures for calculating energy performance of the built environment.

Crawley suggested changing title of the TC to reflect current activities.

[Action 1] Crawley to head working group

Basecamp (5 min, Kruis) 4:20

All correspondence through Basecamp. Many roster members are not on Basecamp.

Membership (10 min, Kruis) 4:25

- Changes in TC 4.7 Leadership
 - Succession: Kruis and H. Kim
 - Pruett new Secretary (formalize Handbook succession to secretary?)
 - Baltazar new Handbook chair
- Voting Members
 - Rao rolling off in June
 - DeGraw rolling on in July
- 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
 - Several CMs that have not attended regularly, considering removing from the roster

- Succession plans for Subcommittee Chairs

Announcements/Liaisons (10 min, Kruis) 4:35

- TAC Section 4 (Pat Marks) **Roster updates due to ASHRAE Feb. 15.**
- Research (Dennis Landsberg)
- Handbook (Jeff Boldt)

Subcommittee Reports (62 min) 4:45

Standards (15 min, Neymark) 4:45

- 140-2020: ***Method of Test for Evaluating Building Performance Simulation Software*** (Neymark/McDowell)
 1. **Standard 140, first published in 2001, is widely referenced** (ASHRAE 90.1, 90.2, 189.1; IECC; and others)
 - a. New: 90.1-2022, published Dec 2022, refs 140-2020 (except Secs. 7,8)
 - b. ASHRAE 90.2-2018 Addendum A (published 2021) updates to 140-2017
 2. **Weather Drivers Test Suite led by Tim McDowell**
 - a. Test models' ability to accurately process weather data
 - b. **140-2020-A published last summer.**
 3. **90.1 ECB/140 Acceptance Criteria WG led by Jason Glazer and Tim McDowell**
 - a. Provides normative acceptance range bounds for specific 140 test cases and outputs
 - b. Just published on Jan 31 (2023)
 - c. Referencing proposal under development by IECC-C (commercial) code
 4. **IECC-R (residential) referencing of Standard 140, Section 7, also in progress**
 5. **DOE empirical validation test suites**
 - a. Test specifications intended for Standard 140 are being developed by Argonne, NREL and ORNL.
 6. **Whole Building Model (WBM) Tests , led by Jian Zhang of PNNL**
 - a. This addresses building types applied in Standard 90.1 and is a different testing paradigm than the more diagnostic isolated-physics test suites applied so far for Std 140.
 - b. Work on feasibility of developing 90.1 medium office building test specs interpretable by multiple programs is in progress with three building performance simulation tools. Feasibility looks good with good agreement among results.
 - c. Work is proceeding on developing a test specification intended for external simulation trials (outside of their project team) and eventual inclusion in Standard 140 after completion of simulation trial iterations.
 7. **Airside HVAC BESTEST Volume 2 test suite led by Neymark**

- a. Airside 2 builds more realistic annual hourly software-to-software comparative tests off of Airside 1 steady-state tests that compare software to analytical solutions.
 - b. Test spec development in progress, though delayed this cycle for Weather Drivers, Acceptance Criteria, and Empirical Validation activities.
 - 8. **SSPC 140 voted to recommend IBPSA-International co-sponsorship of the Standard 140**
 - a. ASHRAE will be the lead organization. This promotes use of Standard 140 internationally.
 - 9. **140 Activities Roadmap update:** Tim recently overhauled the document, which comprises the activities described above along with known test suites for consideration. SSPC 140 will address prioritization of these activities.
 - a. "Prioritization Roadmap" document posted at: <http://data.ashrae.org/standard140/>
 - 10. **140 Stakeholder meeting for 2023:**
 - a. DOE seeks to gather feedback from beyond the SSPC 140 membership on how to further improve Standard 140
 - b. SSPC 140 suggests to focus on obtaining feedback from AHJs (documents and agencies that cite Standard 140), and what their needs are with respect to referencing Standard 140 and its software acceptance criteria.
 - c. Contact Ralph Muehleisen if you are interested in attending and/or know anyone at AHJs that we should contact.
 - 11. Other items we are working on include Automation of the standard (e.g., processing submitted results) and a User's Manual – both intended to facilitate use of the Standard and led by Jason Glazer; and updating the Standard 140 Roadmap, led by Tim McDowell.
- 205-2022: ***Standard Representation of Performance Simulation Data for HVAC&R and Other Facility Equipment*** (Barnaby/Kruis) – Barnaby reporting
 - 1. 205 is developing a scheme for adapting machine readable schema information from a common base source; this promotes consistency of data content/format.
 - 2. **205 is recently published (! Dec 30, 2022)** with data models standardized for water-cooled chillers, DX refrigeration, electric motors and drives, etc (there are 7 equipment types total)
 - 3. Continuing as an SSPC:
 - a. Member call closes Mar 10
 - b. Will meet as an SSPC in Tampa
 - 4. Prioritized items for future addenda covering new equipment: ERV, HRV, boilers, air-cooled chillers
 - 209-2018: ***Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings*** (Glazer/Crawley/Kolderup) – Kolderup reporting
 - 1. PC reformed in 2021 as SSPC: Up to 40+ members (VMs and NVMs)
 - 2. 13 topical Working Groups (e.g., facades, quality assurance, etc)
 - 3. Addenda planned topically, first addendum is modeler qualification.

- 229P: **Protocols for Evaluating Ruleset Implementation in Building Performance Modeling Software** (Goel/Glazer) – Kolderup reporting
 1. Protocols are for evaluating models from defined rule sets, e.g., for baseline and proposed models.
 2. The standard defines a schema that can be read for the purpose of ruleset checking
 3. Working groups for:
 - a. schema ruleset model report (RMR);
 - b. ruleset checking
 - c. terminology of the standard
 4. PNNL is developing a checking tool for 90.1-2019 modeling.
 - a. 229 intended to be updated as needed, as rule bases change
 5. Public review planned for 2023.
- 232P: **Schema-Based Building Data Model Protocols** (McDowell)
 1. 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.
 2. Hoping for public review by summer.

Honors, Awards, and History (5 min, Haberl) 5:00

No nominations yet. 2 pending that need to be written and submitted.

Website (2 min, J. Kim) 5:05

- <https://tc0407.ashraetcs.org/>

Handbook (5 min, Baltazar) 5:07

Program (10 min, Kastl) 5:12

1 program set to be submitted for Tampa meeting (Annual Meeting 2023)

Program proposals due Feb 27, 2023 for Tampa meeting (Annual Meeting 2023)

Program proposals due Aug 2, 2023 for Chicago meeting (Winter Meeting 2024)

Research (10 min, McDowell) 5:22

ASHRAE to fund \$5.5 million for research this year.

RP 1661 Development and Validation of Dynamic Models for the Evaluation of Chilled-Water Systems Control Strategies in the ASHRAE Handbook - work is complete. [Motion 2] Pruett moves to approve report. Kim seconds. Passes 4-0-0 CNV.

RP 1815 awarded.

RP 1816 awarded and back underway after COVID-induced delays.

TRP 1857 will be reviewed during executive session for award recommendation.

Simulation and Component Models (5 min, Ball) 5:32

Edwin Lee willing to become Vice Chair for SCM.

Data-Driven Modeling (5 min, Smith) 5:37

1 pending RTAR - Hyojin.

2 vice chair volunteers.

Multiscale Building Energy Modeling (5 min, Judkoff) 5:42

RTAR in progress - Daniel Villa. Needs comments by April 1st.

Joe Huang starting an RTAR and would like comments by April 1st.

1 program organized, hopefully for Tampa meeting.

Related Activities Reports (15 min) 5:47

- Standard 90.1 Appendix G has added Standard 209 as a reference
- TC 4.1
- TC 4.2 Have 3 active research projects
- TC 4.4 Increasing scope to include embodied carbon
- TC 4.10
- TC 7.6
- Guideline 14 Completed
- MTGs
- IBPSA-USA EPSI (Emerging Professionals and Students of IBPSA) link on website
- IBPSA-World
- Modelica
- Others?

New Business (5 min) 6:02

Adjourn (H. Kim) 6:07

[Motion 3] Fontanini moved. H. Kim seconded.

Executive Session (H. Kim, 15 min) 6:12

All non-voting members (and any voting members with conflicts) are required to leave while the voting members consider recommendations to select project teams for research project(s).

Voted on project awardee.

Appendix A: Upcoming Meetings

- June 24, 2023 - Tampa, FL
- Jan 20, 2024 - Chicago, IL
- June 22, 2024 - Indianapolis, IN
- Feb 8, 2025 - Orlando, FL
- June 21, 2025 - Phoenix, AZ

Appendix B: Resources

- ASHRAE's Research Proposal Process:
 - <https://www.ashrae.org/file%20library/technical%20resources/research/ashrae-research-flowchart-r6.pdf>
- 4.7 Committee Home Page:
 - <http://tc0407.ashraetcs.org/>
- 4.7 BaseCamp Page:
 - <https://3.basecamp.com/3106353/projects/8174587>