

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
1791 Tullie Circle, N.E./Atlanta, GA 30329
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TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. TC 6.5 DATE January 31, 2022

TC/TG/MTG/TRG TITLE Radiant Heating and Cooling

DATE OF MEETING January 31, 2022 LOCATION VIRTUAL

MEMBERS PRESENT		
Ongun Berk Kazanci	Robert Bean	Brett Austin
Fred Bauman		Him Ly
Ryan Westlund	Michael O'Rourke	David Springer

MEMBERS ABSENT
Jaap Hogeling (non-quorum)
Noah Zallen
Richard Bowman

DISTRIBUTION

<i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head:	Dawen Lu
TAC Chair:	Larry Smith
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters:	Steven Hammerling
Standard Liaison Manager Of Research & Technical Services	Craig Wray Mike Vaughn
Research Liaison	Stefan Elbel

MEETING MINUTES
TC 6.5 – RADIANT HEATING & COOLING
WINTER 2022 ANNUAL CONFERENCE MEETING (VIRTUAL)
January 31, 2021
2 pm – 4 pm

TC 6.5 Positions and Subcommittee Chairs

TC Chair	Ongun Berk Kazanci
TC Vice Chair	Paul Raftery
TC Secretary	Ryan Westlund

Programs Subcommittee Chair	Noah Zallen
Research Subcommittee Chair	Carlos Duarte*
Standards Subcommittee Chair	Robert Bean*
ALI & Education Subcommittee Chair	Robert Bean
Handbook Subcommittee Chair	Devin Abellon
Membership Subcommittee Chair	Jun Shinoda*

*Newly appointed as of this meeting

Published Meeting Agenda (Ongun Berk Kazanci, TC Chair)

Meeting Agenda

1. Introduction of members and guests
2. Roll call for quorum
3. Reading of previous meeting minutes and vote for approval
4. Agenda amendments
5. Information from Section 6 Chair meeting
6. Subcommittee Reports
7. Old Business
8. New Business

9. Liaisons introduction and reports

10. Technical presentations

11. Adjourn

Meeting Minutes:

1. **Introduction of members and guests.** **See Appendix A for list of attendees
2. **Roll call for quorum**
 - a. **Voting members:** 8-11 (Quorum ✓)
 - b. **See Appendix A for list of attendees
3. **Reading of previous meeting minutes and vote for approval**
 - a. Motion for approval- R. Bean; seconded- M. O'Rourke
 - b. Approved unanimously.
4. **Agenda amendments**
 - a. Stefan Elbel, RAC Liaison is in attendance → move his topics to beginning of Agenda
 - b. G.D. Mathur, handbook liaison for applications is in attendance → move his topics to beginning of Agenda
 - c. Motion to reaffirm Technical Committee 6.5 for the 2022-2023 year, Motion for reaffirmation- R. Bean; seconded- D. Springer
 - i. Approved Unanimously
5. **Information from Section 6 Chair Meeting**
 - a. Relayed by Chair
 1. TC Collaboration Area for committees to use is available at Caesar's Palace, Octavius 4 or 11, Sun-Wed 7:30 AM to 4:00 PM (Wed. until 1:00PM)
 2. Two new functional groups formed
 - a. TG2.RAST- Reactive Air & Surface Treatment
 - b. MTG.RES- Resilience
 3. "Open Mic" for upcoming TAC Meetings, ASKTAC@ashrae.net – Resource for all TAC/TC related questions, comments, etc.
 - b. TAC has finished reworking TC's
 - i. A full listing of the interim meetings can be found on the technical committees webpage (www.ashrae.org/technical-resources/technical-committees)
 - c. Continued focus should be maintained on keeping TC website up to date
 - d. Additional topics will be shared with TC via Basecamp → keep an eye out for more to come
6. **Subcommittee Reports**
 - i. **Programs Subcommittee** (Noah Zallen, Chair - absent)

1. Current Program(s) (Winter 2022)
 - a. Seminar 28: Basic Infrared
 - b. D. Abellon needs substitute host for 8AM Seminar start, follow up offline with M. O'Rourke (tentative) **[ACTION: D. Abellon]**
 2. Upcoming Calendar for Programs
 - a. Las Vegas, NV (See above) (Winter 2022)
 - b. Toronto, ON (Summer 2022)
 - c. Atlanta, GA (Winter 2023)
- ii. **Research Subcommittee** (Fred Bauman, Retiring Chair → Carlos Duarte, Incoming Chair)
1. RTAR – Solar Load (Peter Simmonds)
 - a. Posted on Basecamp, please review **[ACTION: ALL]**
 - i. Especially pertinent to those who volunteered to assist in review.
 - b. Need status update **[ACTION: P.Simmonds]**
 - c. In order to be ready for March RAC deadline, complete RTAR to be routed to TC for approval **[ACTION: P.Simmonds]**
 2. PTAR 0001 – Radiant Design Guide (Fred Bauman)
 - i. RAC's main concern at this point is "What prior or ongoing ASHRAE research will be disseminated through publication of this [PTAR]...."
 - ii. Resources from P. Simmonds and R. Bean compiled and shared as part of the submission in December to RAC
 - b. Author proposes we vote on this to leave open to add references for prior work
 - i. F. Bauman motions above → Chair Seconded
 - ii. Approved unanimously
 - c. The PTAR was submitted to RAC in December; however, no updates from RAC so far
 3. Other Industry Research
 - a. CBE
 - i. The effect of forced air on radiant surfaces' convection coefficient
 1. Clarification from R. Bean → modeled as ceiling "cooling curtains" in CFD
 2. Determine the critical attributes
 - ii. The climate chamber lab will be renewed
 - iii. Joint research with DTU (Pawel Wargocki) to show statistically the previous assertion that individual productivity is directly related to temperature has been overstated.
 - b. DTU
 - i. Continued work on PCM and radiant ceiling panels; Currently working through assemblies' fire ratings
 - ii. Research shift to *resiliency*
 1. Evaluating resiliency, create KPI's for radiant cooling

systems that can aid to better deal with heat waves or power interruptions

2. Primary comparison will be between radiant systems and forced air
3. R. Bean suggested to look into potential of showing preventable deaths, based on figures from 2021 heat wave
4. Potential for release of results after 2022 annual conference

iii. Published [a new paper](#) on radiant ceiling panels, and the effects of difference between the room and plenum temperatures on the cooling capacity of the panels

- c. Clark Pacific and CEC continuing to look at cost effectiveness of radiant systems in residential applications (Stockton, CA) → ongoing study to demonstrate ceiling panels with thermal storage using air to water heat pumps; James Haile is leading research (presented to TC at 2021 Annual Conference- Phoenix).

iii. ALI & Education (Robert Bean, Chair)

1. Volunteer needed to take on developing fundamentals course
2. Chair (Ongun B. Kazanci) accepts developer role [**ACTION: Chair**]

iv. Handbook (Devin Abellon, Chair)

***NOTE: Chronologically occurred prior to Agenda #5 due to visiting liaison*

1. Ch. 55 (Applications): Radiant Heating and Cooling
 - a. Prepare for 2023 Publication
 - b. All electronic versions of chapters can be found on Google doc links for all sections (See Appendix C)
 - c. Current workplan outlines completion of final draft by 4/22/2022
 - d. Original workplan of having many different authors doing smaller pieces to be compiled in December 2021 is up for debate as internal deadlines not met
 - e. Three options proposed by Subcommittee Chair
 - i. Chapter rewrite with condensed author committee to be completed by April
 1. Note: P. Simmonds has already worked on the revamp of substantial sections
 - ii. Vote to reaffirm Chapter with minor changes by April
 1. Note: this would likely postpone the combination of Ch. 55 & 6 per previously agreed merger
 - iii. Vote to reaffirm Chapter with no changes
 - iv. Online Handbook Capabilities
 1. Additionally, it was discussed how other TC's use the online handbook for continuous chapter changes/improvements, although it was acknowledged that this is likely not coupled with complete rewrites of the scope TC 6.5 is looking at.
 2. Enhanced features from online version: Interactive charts, Spreadsheets, Videos, Audio Files

- f. Target final vote from TC on 4/15/2022
 - g. All to review existing chapter to basecamp and let committee review what we're voting on → take formal ballot of voting members before April deadline [**ACTION: Handbook Subcommittee**]
- 2. Ch. 52 (Applications) Snow and Ice Melting (Ryan Westlund)
 - a. Review of Chapter by R. Westlund leads to no substantial edits at this time
 - b. Recommendation made to "pass as is"
 - 3. Ch. 16 (Systems & Equipment): Infrared Radiant Heating (Don Larsson)
 - a. No progress since 2021 Annual Conference (Phoenix)
 - b. Review of existing research and publications. [**ACTION: D. Larrison**]
 - c. Final draft review at 2023 Winter Conference (Atlanta)
 - d. Final Approval planned for April 2023
 - 4. Ch. 34 (S&E): Residential In-Space Heating Equipment
 - a. Historically this has been passed "as is"
 - b. No further discussion
 - c. Final draft review at 2023 Winter Conference (Atlanta)
 - d. Final Approval planned for April 2023

v. Standards & Industry Codes/Certifications (Richard Watson, Outgoing Chair)

- 1. SSPC 90.1 Committee Liaison (Richard Watson) *No update*
- 2. SSPC 55 Committee Liaison (Robert Bean)
 - a. Discussion about realignment using "class systems"
 - b. Discussion about dropping PPD, unlikely to be acted upon at this point
- 3. ISO/TC 205 Committee Liaison (Prof. Kim) *No Update*
- 4. UMC Radiant Cooling Task Group Liaison (L. MacNevin)
 - a. 2021 May technical committee review accepted all proposed changes from Task Group, except for a clear definition of "chilled water"
 - i. "chilled water" topic addressed in public comment submitted separately in December 2021
 - ii. Quantifiable verbiage of the entering water temperature requirements above dew point removed in favor of "per manufacturers"
 - iii. Alignment with Std. 55 stating min. floor temperature of 66F in cooling mode
 - iv. Clarified that radiant cooling conducted above space dewpoint shall not require insulation of manifolds and circuit tails.

7. Old Business

- i. UN SDG's
 - 1. Previous inquiry as to whether TC 6.5 can list the SDG's directly enhanced by radiant systems
 - 2. ASHRAE TAC does not support TC posting on website

8. New Business

1. New Research Subcommittee Chair → Carlos Duarte is accepted as new chair with Fred Bauman stepping down (retired)
2. New Standards Subcommittee Chair → Robert Bean is accepted as new chair
3. New Membership Subcommittee Chair → Jun Shinoda is accepted as new chair
4. Check-in with current Programs Subcommittee Chair, Noah Zallen. **[ACTION: D. Abellon]**

9. Liaisons introduction and reports

**NOTE: Completed Agenda item #9 through Handbook Subcommittee & Research Subcommittee updates

10. Technical presentations

- i. Solicit volunteer guest presenters for next TC meeting
- ii. A. MacPherson presents on study of heat transfer around windows using hydronic pex pipe installation
 1. Highlighted the use of UN SDGs integrated into design of residential construction

11. Adjourn

- i. Motion: F. Bauman;
- ii. Second: R. Bean;
- iii. Passes- Unanimous (TIME: 7:31 EST)

APPENDIX A: **List of attendees

TC 6.5 Positions and Subcommittee Chairs (8):

Ongun Berk Kazanci, Chair, VM
Paul Raftery, Vice Chair
Ryan Westlund, Secretary, VM
Robert Bean, ALI & Education Subcommittee Chair & Incoming Standards Subcommittee Chair, VM
Fred Bauman, Outgoing Research Subcommittee Chair, VM
Carlos Duarte, Incoming Research Subcommittee Chair
Michael O'Rourke, VM
Brett Austin, VM
Devin Abellon, Research Subcommittee Chair
Jun Shinoda, Incoming Membership Subcommittee Chair
Him Ly, VM

Additional Attendees (19):

G.D. Mathur, Handbook Liaison
Stefan Elbel, RAC Liaison

Hank Cullinane
Scott Hellendrung
David Bodenschatz
Auralee MacPherson
Jim Paschal
Tae Kwon
Lance MacNevin
Don Larsson
Fred Bauman
David Nazarro
Stefano Schiavon
Jeff Matson