

**ASHRAE TC 8.11  
Unitary and Room Air Conditioners and Heat Pumps  
Meeting Minutes**

**2021 ASHRAE Summer Meeting  
Virtual Conference**

**1. Call to order** **Kirkwood**

Call to order at 2:05 PM EST

**2. Review Scope**

Technical Committee 8.11 is concerned with products for use in comfort cooling and/or heating systems. The factory engineered vapor compression systems include: (1) unitary equipment which generally requires the field engineering of the product mounting and ducting, piping and electrical connections, (2) room air conditioners such as window mounted units and ductless split systems and (3) packaged terminal equipment. Specifically excluded are unitary combustion-engine driven systems.

**3. ASHRAE Code of Ethics Commitment** **Kirkwood**

“In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests.” See full ASHRAE Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>

**4. Introductions** **All**

a. Determination of a quorum Creamer

*VOTING MEMBERS FOR THIS MEETING (Need 7 for a Quorum)*

x	Eric Berg	(6/2024)	x	Kishan Padakannaya	(6/2021)
	Chad Bowers	(6/2022)	x	Bo Shen	(6/2021)
x	Craig Bradshaw	(6/2024)	x	Kirk Stifle	(6/2023)
x	Henry ‘Skip’ Ernst	(6/2021)	x	Chris Stone	(6/2022)
x	Chad Kirkwood	(6/2022)	x	Jon Winkler	(6/2024)
	Darin Nutter	(6/2021)		Kasey Worthington	(6/2022)

9 of 12 members present, quorum established

**5. Agenda additions** **All**

None

**6. Chair’s Report** **Kirkwood**

a. Chair’s Goals

**1<sup>st</sup> goal** - Focus on what the rating procedure will look like in the future, load based, controls, climate

TC 8.11 Subcommittee has been established. Next meeting is on 7/14/21 2-5 EST

Several organizations represented (AHRI, IEA, DOE, CSA, etc.)

**2<sup>nd</sup> goal** – The release of SPC 37

b. Announcements and Highlights from TC Chairs Breakfast Meeting

**7. Liaison reports (as they arrive)** **Liaisons**

a. MTG – Low GWP Refrigerants Siva G

**AHRI Research Projects:**

AHRTI-9014 project on A2L Refrigerant Sensor Evaluation. Phase 3 of the project is complete, and the consolidated report will be available on AHRI website in the next few weeks.

Assessment of refrigerant leakage mitigation. AHRTI-9015 project is complete and the findings from this is being considered in listing and application standards (UL 60335-2-40 Ed. 4 draft and Standard 15.2)

Draft reports ready for review soon - ORNL projects modeling effort Refrigerant Charge level & Mitigation. 2nd ORNL project on how refrigerant leakage behavior for different types of AC

No other areas of research yet

One suggestion for further research came up on new proposed ban on PFAS coming from fluorocarbon gases. Will be discussed at the next meeting.

## **Research**

RP-1794 "White Paper Investigation Relating to the Use of Odorants in Flammable Refrigerants": Project complete. Final report (March 2019) available on ASHRAE portal.

RP-1884 "The incorporation of odorants in flammable refrigerants to improve leak detection (Experimental Phase)": short list of candidates from RP-1794 identified, contractor selected and project starting (started?) in April 2021.

RP-1806 "Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update": Project behind schedule due to pandemic. Contractor will complete a pilot risk study for reach-in coolers by Aug 2021. Based on this go/no go decision on further work will be made.

RP-1807 "Guidelines for Flammable Refrigerant Handling, Transporting, Storing and Equipment Servicing, Installation and Dismantling": Project complete. Final report (Dec 2018) available on ASHRAE portal.

RP-1808 "Servicing and Installing Equipment using Flammable Refrigerants: Assessment of Field-made Mechanical Joints": Project complete. Final report (Dec 2019) available on ASHRAE portal.

RP-1855 "Determination of the Impact of Combustion Byproducts on the Safe Use of Flammable Fluorinated Refrigerants": Project in progress. Publication of report held to allow for incorporation of results from AHRTI-8028 project ("A2L Refrigerants and Firefighter Tactical Considerations").

TRP-1879-C "Foamability Properties of LGWP Refrigerant and Oil Mixtures": conditionally accepted but waiting for RAC approval to go out for bid.

## **Research Communications Plan Update**

- Presented Seminar 44 at Kansas City Meeting (June 2019) for RP-1806, RP-1807, RP-1808
- "ASHRAE Research Overview for Lower GWP Flammable Refrigerants"
- ASHRAE Journal article "Research Update on Lower GWP Flammable Refrigerants" published 2020-Feb (Volume 62, Number 2)
- 6th International Symposium on Alternative Refrigerants for High Ambient Temperature Countries (March 2-4, 2020) [event was cancelled]
- Discussion with MTG.LowGWP Program S/C for Las Vegas program (2022-Jan) to include RP 1855 and RP-1806.
- Attached presentation slides with additional details.

## **Codes and standards**

AHRTI Safe Refrigerant Transition Task Force: the task force currently focusses on communications, outreach, research, DOT/shipping regulations, and code adoption, including an effort to have US Climate Alliance states pivot their efforts away from adopting SNAP 20/21 rules toward updating building codes to coincide with the planned transition in 2025-2026.

Chair updated on Kigali Amendment ratification status, The AIM Act, recent EPA SNAP listings Rule 23 to allow for select A2L refrigerants to be used in new residential and commercial AC & heat pumps, updates on California and Washington states proposed prohibitions on use of HFCs and timeline.

Chair also updated on the status of various standards such as ASHRAE Std 15, Std 15.2, Std 34, UL 60335-2-40, IEC 60335-2-40, ISO 817, and ISO 5149 as well as on ICC and IAPMO code actions.

**Programs**

Presentations from AHRTI-8028 and AHRTI-2014 will likely be there. Winter 2022 program will be final in late September 2021.

- b. Refrigeration Technology Hwang  
Hwang not present
- c. RAC Seeton  
Seeton not present
- d. Section 8 Mercer  
Mercer not present

**8. Approval of minutes from Virtual Winter Meeting Kirkwood**

Craig Bradshaw makes motion, Skip Ernst 2<sup>nd</sup>

Motion carries (9-0-0-2) yes, no, abstain, absent

**Membership/Roster Creamer**

Starting August 1<sup>st</sup>:

Name	Role	Voting
Chad Kirkwood	Chair	Yes
Kasey Worthington	Vice Chair	Yes
Scott Creamer	Secretary	
Eric Berg	Research Chair	Yes
Chris Stone	Standards Chair	Yes
Robert Berry	Handbook Chair	
Grant Wheeler	Program Chair	
Darin Nutter	Webmaster	Yes

Name	Role	Voting
Henry Ernst		Yes
Kirk Stifle		Yes
Kishan Padakannaya		Yes
Bo Shen		Yes
Chad Bowers		Yes
Craig Bradshaw		Yes
Jon Winkler		Yes

Rolling of at the end of June: Skip Ernst, Darin Nutter, Kishan, Bo Shen

Rolling on in July: Andrew Hjortland, Scott Creamer, Khaled Saleh, Davide Ziviani

Chad will roll off as Chair 6/2022, at that time Kasey will be Chair, Scott Creamer will be Vice Chair, will need to select a new Secretary

**9. Subcommittee reports**

- a. Unitary Next Generation Test Procedure Chad Kirkwood  
Next TC 8.11 Sub Committee meeting to be held 7/14/2021 @1 PM EST  
Reviewed meeting minutes from the last 3 meetings which will be available in Basecamp shortly after the ASHRAE conference  
Lot of activity in load based and native control testing  
Hot topic is cold climate 5-degree H4 testing
- b. Programs Grant Wheeler  
Current conference seminars:

Seminar 55 – The Load-Based Testing Approach

Reviewed the 8 tracks at the Las Vegas Meeting and due dates

**Ideas for Las Vegas 2022 Winter Conference**

Debate for load-based testing

Standard 37

**TC6.3 Appendix M1 changes effect**

6.3 Co-Sponsor

Lead: Siva Gopalnarayanan

Combine with SPC 37 presentations

**Future of heating for retrofit residential applications**

Lead

6.3 Co-Sponsor

CCHP vs. traditional vs. dual fuel source

Potential speakers: Chris Diamond, national reports, Bo Shen (ORNL) regional analysis, Robert Mowris (minim split heat pumps)

**Alternative fuels for traditional furnaces**

Contact Xudong Wang for AHRI

**Passive solar super insulated homes**

Lead: Robert Mowris

Speaker: Hugh Henderson, NYSERDA,

ASHRAE 227p (a lot of info about HVAC equipment) / 228 NZE

What the minimum heating/cooling load required?

Ventilation/economizing for homes

c. Research

Eric Berg

**Current Projects**

Project	TC/TG	Title	PI	Status	Comments
1705	8.04, 8.11	Investigation of Air-side Fouling on Outdoor Condensing Heat Exchangers	University of Nebraska	Ongoing	Has had a complaint filed to RAC. Chris Seeton working with PMS to make changes to the conclusion.
1721	8.11, 3.4, 10.3	Oil Return and Retention in Unitary Split System Gas Lines	Purdue University - Eckhard Groll, Jim Braun, Vatsal Shah	Ongoing	Generated correlations for the different OCR's for horizontal and vertical lines and calculated the flow reversal limit. Need to decide if handbook tables would need to be generated. Can provide 3 EES models as Beta versions. Will spot test with 19.9mm line and with POE 100
1733	8.11	Develop Design Criteria for Psychrometric Air Sampler and Mixer Apparatus for Use in	Oklahoma State University - Christian	Ongoing	Completed modeling for different geometries and materials. Currently building test setup. Next

		ASHRAE Test Standards	Bach/Omar San		PMS targeted for August/September
1743	8.11	Effect of Inlet Duct and Damper Design on ASHRAE 37/116 Fan Performance and Static Pressure Measurements	Oklahoma State University - Christian Bach/Omar San	Ongoing	Report complete. Working on improving drawings for alternate ductwork. Updates will need to wait until Khaled is back at school, August/September timeframe. Christian to check if a no cost extension is necessary.
1785	8.11, 8.4, 6.3	Refrigerant Charge Modeling in Coils for Residential Split Systems	Oklahoma State University - Christian Bach/Craig Bradshaw	Ongoing	Completed the first coil. Working on creating ductwork for OC1. Next PMS meeting targeted for September
1824	8.11	Accounting for Barometric Pressure Impacts on Psychrometric Performance Testing of Unitary Air Conditioning and Heat Pump Equipment	Solomon Yin - University of Louisiana Lafayette	Ongoing	Looked at using a correlation for cooling operation. The correlation is dependant on coil design. Starting experimental evaluation, 4 units, will run 1 cooling, 2 heating. Test chamber under construction. Will also test in Montana. Using AHRI audit units, so audit data from Cortland will be available. Next PMS end of June or early July. Will need no cost extension

### Co-Sponsor Opportunities

Idea	Co-Sponsor	Responsible
Oil Retention in Microchannel	TC 8.4, TC 3.4?	Chad Bowers
Filtration in minisplit and vrf systems	TC 2.4	Tom Justice
Capillary Tube and Short Tube Orifice Performance for Low GWP Refrigerant	TC8.8	Bob Bittle, Vance Payne, Everado Cano, Christian Bach

**Future Ideas**

<b>Idea</b>	<b>Description</b>	<b>Responsible</b>	<b>Comments</b>
Room Stratification impacts on Psychrometric Testing	Evaluate Room Types and Propose Requirements Air Velocity requirements, minimum, maximum Air Mixing Temperature Humidity Room Air vs. Air entering the test sample - Recirculation impacts - Setup requirements dimensions within test room - Location of Air Sampling	Byron Horak Scott Creamer	Had discussion during an SPC 37 meeting, received several comments. Sent comments to Scott to be incorporated into the work statement.
Dynamic measurement	How do you define tolerances around dynamic measurements related to load based testing	Grant Wheeler	Will continue to discuss at the UNGTP SC meeting
Dynamic measurement of process variables (humidity, temperature, airflow, etc)	Are there better ways to make measurements for non-steady test conditions found in load based testing	Christian Bach, Kirk Stifle	Will continue to discuss at the UNGTP SC meeting
Using load based testing to generate a map of data that would be used in a simulation for a specific region or load profile.	Simulation based rating methodology for seasonal rating of system performance of unitary products	Chad Kirkwood, Jim Braun, Christopher Dymond, Khaled Saleh, Grant Wheeler, Bob Berry	Need volunteer to write RTAR. Also a topic in 8.7 VRF. Mike Stem will discuss in 8.7 and will follow up with 8.11.
Non-tested combination simulations using load based tesitng	How to generate ratings for non-tested combinations using load based test data		Will continue to discuss at the UNGTP SC meeting
Can you use load based test to generate a degradation coefficient.	What are the dynamic behaviors we are trying to capture? Hybrid approach, steady state and dynamic		Will continue to discuss at the UNGTP SC meeting

d. Handbook

Bob Berry

All 3 book chapters are up for review with some revisions coming out before next conference

Pat Collins volunteers be a lead reviewer for “room air conditioners” section

e. Standards

Chris Stone

ASHRAE 37 is most active standards revisions

Good progress over the last year

ASHRAE SPC 16 no meeting scheduled on winter conference

SPC 205 no update to report

SPC 221 field measurements meeting tomorrow 6/24 at 2:30 EST

SSPC 41 update

Lot of activity with addendums to modify stability and uncertainty criteria.

f. Web site

Darin Nutter

Darrin not present

**Action Item (Scott Creamer):** Need to investigate membership requirements as to who can have access to Basecamp file within a TC or TC Sub-committee

**10. Old Business**

None

**11. New Business**

None

**12. Adjourn**

Adjourn at 3:43 EST