



ASHRAE TC 3.1—Refrigerants and Secondary Coolants
American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
Toronto, Ontario, CA & Virtual
Hilton, Varley (C)
2:30 – 4:30 p.m. EDT

Those who were present in-person are highlighted in yellow; those who attended virtually are highlighted in green. Those who are not highlighted were not present.

Name	Affiliation
Voting Members	
Dennis Dawe (2025)	CBRE
Lydia Dobler (2024)	Calumet
Josh Hughes (2025)	Chemours
Sarah Kim (2025)	Koura
Valerie Lisi – Research SC (2024)	Carrier
Julie Majurin – Chair (2023)	AHRI
Mark McLinden (2025)	NIST
Alice Riemer (non-quorum) (2023)	Danfoss
Rosine Rohatgi (2025)	Spauschus
Casey Scruggs – Standards SC (2024)	Metalloid
Marc Scancarello (2024)	Emerson
Steve Kujak – Webmaster (2022)	Trane
Samuel Yana Motta – Vice Chair (2025)	ORNL
Non-Voting Members	
Michael Petersen – Handbook SC	Trane
Chris Seeton – Programs SC	Koura

Liaisons & Other:

William Dols - Section 3 Head
CheeSheng Ow - RAC Liaison
Michael Vaughn - ASHRAE Staff Liaison
Eric Granzow - Handbook Liaison
Theresa Weston - Standards Liaison

MINUTES

ASHRAE TC 3.1—Refrigerants and Secondary Coolants

TC 3.1 is concerned with all properties and functions of refrigerants and secondary coolants, including commercial and experimental materials.

1. CALL TO ORDER

- Introduction of members and guests

A roll call of voting members was conducted. Names and affiliations of in-person and virtual attendees were recorded and are included in Appendix 1.

- Quorum determination

9/12 quorum voting members were present; quorum was established.

2. ASHRAE CODE OF ETHICS

ASHRAE's Code of Ethics was reviewed. A link to the full Code of Ethics was provided.
[ASHRAE Code of Ethics](#)

3. ASHRAE COMMITMENT TO CARE

ASHRAE's Commitment to Care was briefly discussed.
[ASHRAE Commitment to Care](#)

4. AGENDA REVIEW

The agenda was reviewed.

Motion: Approve the agenda as written.
1st: Steve Kujak; 2nd: Valerie Lisi
8/0/0 CNV (yes/no/abstain/chair)

5. MINUTES OF THE LAST MEETING (January 2022 Hybrid – Las Vegas)

The minutes from the previous meeting were reviewed.

Motion: Approve the minutes as written.
1st: Marc Scancarello; 2nd: Josh Hughes
The minutes were agreed to by consensus.

Note: Formal approval will be done by letter ballot.

6. ROSTER REVIEW AND ANNOUNCEMENTS

The roster was reviewed, noting that any membership changes occur beginning July 1st. Roster changes are submitted each year after the winter meeting and then go into effect on July 1st.

7. TC CHAIR'S MEETING REPORT

Updates from the TC Chair's meeting were given.

- *Changes have been made to the Functional Group (TC/TG/TRG/MTG) Manual of Procedures (MOP) and a new MTG MOP has been written. www.ashrae.org/tac*
- *TCs are being encouraged to develop a strategic vision. This will be added to the agenda for the next TC 3.1 meeting.*
- *There will be a large focus on decarbonization initiatives; liaisons from each of the TCs will be requested. Chris Seeton and Valerie Lisi expressed interest in being liaisons for TC 3.1.*
- *The top program tracks at this meeting were identified as: HVAC&R Systems & Equipment and IAQ, Energy Use, Comfort and Health of Sustainable Buildings*
- *For the 2023 winter conference, there will be a program track on Refrigerants and Refrigeration.*

8. LIAISON COMMENTS

Stuart Dols (TC 3 Section Head) and CheeSheng Ow (RAC liaison) provided comments during the meeting.

9. SUBCOMMITTEE REPORTS

9.1 HANDBOOK (Michael Petersen)

Updates on the planned handbook chapter revisions were given. Mark McLinden asked for a list of refrigerants that should be included in the updates for Chapter 30. It was suggested that a survey could be distributed to identify the highest priority fluid additions, possibly through TC 3.1 and some of the other relevant functional groups. It was noted that the same question could also apply to Chapter 31. It was recommended that the handbook chair check with ASHRAE Standards staff to determine if they could distribute a survey if TC 3.1 members develop the survey content.

If any members are interested in reviewing the chapters and providing revision recommendations, please reach out to Michael Petersen or the individual chapter leads.

Fundamentals Handbook – next update is for the 2025 publication.

- Chapter 29 (Refrigerants) – Michael Petersen (lead) with Ankit Sethi, Monika McNeil, and Harrison Skye as team members.
- Chapter 30 (Thermophysical Properties of Refrigerants) – Mark McLinden (lead) with Clair Skae supporting.
- Chapter 31 (Physical Properties of Secondary Coolants) – Keegan Yaroch (lead) with Mary Koban and Henna Tangri supporting.

9.2 PROGRAMS (Chris Seeton)

Programs at this meeting

- Monday, June 27, 2022, 8:00 – 9:30 a.m. EDT – Conference Paper Session 8: Refrigerants and HX Research

Previous Program ideas

- Low GWP Refrigerant Candidates to Meet Upcoming Regulation Timelines
- Hot Topics for Secondary Coolants (Brines)
- Emerging Low GWP Refrigerant Innovations and Technologies

New Program ideas

Two new program session topics were proposed. For the first one, there is potentially enough content for two different sessions under the same topic.

- Low GWP Refrigerant Advancements for Decarbonization– Ivan Rydkin to chair a session, and Steve Kujak to chair a second session (if enough participation) – Sarah Kim, Ivan Rydkin, Omar A., Steve K., Ankit S., and Josh H. were willing to contribute. It was suggested that two sessions could be considered, and that an effort should be made to mix in speakers on ‘natural’ refrigerants along with those discussing halogenated options. For topics on ‘natural’ refrigerants, Valerie offered someone from Carrier as a speaker, and Charlie Hon was also suggested as a potential speaker.
- Low GWP Refrigerant Impact on the Codes – Mary Koban to chair a session – Rusty Tharp, P. Johnson, Dick Lord, and Asbjorn Vonsild were identified as potential speakers.

Motion: Accept the two proposed program sessions and chairs for the Atlanta (Winter 2023) meeting.

*1st: Valerie Lisi; 2nd: Marc Scancarello
8/0/0 CNV (yes/no/abstain/chair)*

Note that the timeframe to make submissions is during the beginning of August, and these submissions need to be sent to the Track Chair.

9.3 RESEARCH (Valerie Lisi)

Current and proposed research topics were discussed. There was a previous WS on Humidity Effects on Burning Velocity (1791-WS) that the members agreed to remove from the list due to other relevant research that has since been conducted. In addition, an RTAR that had been drafted by Mary Koban and Bob Low on Hot Surface Ignition Temperature was also removed from the list due to there no longer being a pressing need for the research.

Two translated papers from Kenji Takizawa were provided and have been posted to Basecamp, one on Quenching Distance and the other on Constant Volume vs. Constant Pressure methods for Burning Velocity.

Number	Title	Contributors	Status/Action
1797-WS	Assessment of the A/B Toxicity Classification Used in Standard 34	Gary Jepson	<i>Val to send an e-mail to Chee and MORTS to verify that the conditions have been met (not in the queue for bid until that happens).</i>
1851-WS	Electrical Properties of New Refrigerants	Ivan Rydkin, Josh Hughes	<i>TC vote at this meeting.</i>
1884-TRP	Incorporation of Odorants in Refrigerants to Improve Leak Detection – Phase 3	Marc Scancarello	<i>A new proposal has been drafted; has been approved and is going out for bid</i>
RTAR?	Re-evaluate Calibration of 200L to 12L Flammability Limits for Borderline Cases	Greg Linteris, Ivan Rydkin, Ryan Hulse, Julie Majurin	<i>TC vote at this meeting</i>

The 1851-WS (Electrical Properties of New Refrigerants) was reviewed. There was a small typo that needed to be corrected, and it was requested to add R-1336mzz(E) to the list of refrigerants.

*Motion: Approve the 1851-WS as modified.
1st: Marc Scancarello; 2nd: Mark McLinden
8/0/0 CNV (yes/no/abstain/chair)*

The RTAR on Calibration of 200L to 12L Flammability Limits for Borderline Cases was reviewed. The RTAR needs to be put in the proper template but there were no additional comments or changes recommended.

*Motion: Approve the RTAR on Calibration of 200L to 12L Flammability Limits for Borderline Cases.
1st: Valerie Lisi
2nd: Mark McLinden
8/0/0 CNV (yes/no/abstain/chair)*

○ **New Research ideas**

- There will possibly be a need for follow-up research after the report for Research Project 1855 is issued; it is expected that 4 or 5 different recommendations will be made for additional work; the TC recommendation at the last meeting was to wait for publication of the report and then to discuss further.

Feedback from TC 3 Combined Research Virtual Meeting on 6/21/2022

- ASHRAE research to supplement above research from Kenji for applicability to std. development or electrical codes
- Investigating the WCFF methodology in Standard 34 and relevance to actual applications

The meeting ended prior to addressing the new research ideas, or the following sections, due to lack of time.

9.4 STANDARDS

- ANSI/ASHRAE Standard 34 (Designation & Safety Classification of Refrigerants) – Steve Kujak/Sarah Kim
- ASHRAE Guideline 6 (Refrigerant Information Recommended for Product Development and Standards) – Lauren Huffman (Chris Seeton, Casey Scruggs, Steve Kujak, Rosine Rohatgi, Dennis Dawe, Sheli Porter)

- ASHRAE Guideline 39 (Method of Test for Measuring Fractionated Compositions of Refrigerant Blends) – Ankit Sethi (Josh Hughes, Rosine Rohatgi, Julie Majurin, Sarah Kim, Dennis Dawe)
- New Standard ideas from the TC

It was suggested at the last meeting to consider a method of test for flammability that would be separate from ASHRAE 34. This could include testing for the LFL as well as burning velocity. It was noted that ISO has a group that was tasked with developing burning velocity test methods, but limited progress has been made. A new chair is needed for that ISO group; Bob Low was recommended as a possible replacement.

10. WEBSITE (Steve Kujak)

- <https://tc0301.ashraetcs.org>

11. OLD BUSINESS

- Basecamp – TC 3.1 site has been set up
<https://3.basecamp.com/3106353/projects/10584516>

12. NEW BUSINESS

13. NEXT MEETING

- Atlanta, Georgia – February 6, 2023

14. ADJOURNMENT

The meeting was adjourned shortly after 4:30 p.m.

Appendix 1 – Meeting Attendees

In-Person		Virtual	
Ivan Rydkin	Sara Kampfe	Rosine Rohatgi	Natalie Dixon
Valerie Lisi	Shelby Kent	Greg Linteris	Neal Lawrence
Morgan Leehey	Chris Campo	CheeSheng Ow	Patrick Coughlan
Chris Seeton	Joe Nigro	Andrew Sumner	Samuel Yana Motta
Sarah Kim	Harrison Skye	Damien Radowski	Steve Baker
Mark McLinden	Doug Tucker	Greg Smith	
Joshua Hughes	Xudong Wang	Harshad Inamadar	
Marc Scancarello	Brad Boggess	Henna Tangri	
Michael Petersen	Bridgett Rakestraw	Joe Karnaz	
Ankit Sethi	Ian Burton	John Senediak	
Felix Flohr	Omar Abdelaziz	Kasinath Nayak	
Tom Watson	Rashid Zakeri	Kris Crosby	
Mary Koban	Mandi Lippard	Min Che	