

**ASHRAE TC 10.1**  
**Custom Engineered Refrigerant Systems, Piping, Controls and Accessories**  
**ASHRAE 2022 Winter Conference – Meeting Report**  
**TC 10.1 meeting agenda February 1, 2022 ~ 1:00 – 3:00 pm PT (UTC -6)**  
**Caesar’s Palace, Milano I-III**  
**(<https://global.gotomeeting.com/join/603159605>)**  
**Jim Caylor, Chair**

**I. General**

- A. Call to order. Chair Caylor called the meeting to order at 3:09 pm CT
- B. ASHRAE Code of Ethics Commitment: 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 interest and behavior that is discriminatory and/or harassing.
  - 1. <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.
- C. Self-introductions & attendance sheet.
- D. Verify quorum – voting members:
  - 1. = Jim Caylor V/23 Chair
  - 2. Dr Adnan H Ayub V/22 Vice Chair
  - 3. = Tom Wolgamot V/24 Program Subcommittee Chair
  - 4. Greg Scrivener V/23 Standards Subcommittee Chair
  - 5. Gordon Struder V/23 Webmaster
  - 6. = Willis Brayman V/23
  - 7. Robert (Alan) Neely V/22
  - 8. = Darrell Peil V/22
  - 9. = Heather Sharif V/23
  - 10. Christopher Williams V/23

5 VM present – Quorum was not achieved.

**II. Additions/changes to agenda. –**

None were made at the time.

**III. Review and approval of 2021 Summer Conference draft minutes.**

- A. Draft minutes on pp 8-14 of this agenda.

**IV. Chair’s Report (Jim Caylor).**

- A. Committee officers.
  - 1. Vacant ---- Research Subcommittee Chair
  - 2. Vacant ---- Handbook Subcommittee Chair
  - 3. Webmaster – Andy Schoen
- V. Liaison Reports.
  - A. Section 10 Head – Charles Henck ([SH10@ashrae.net](mailto:SH10@ashrae.net)).  
Mr. Henck advised that there is an emergency roster update that can be used – Talk to Tara Thomas on ASHRAE Staff  
Make sure that Basecamp and the Web site is current.  
Vote every year to maintain TC.

Consider having virtual meetings prior to Toronto, if necessary.

B. Other Societies.

1. ASME (Jim Caylor).

- a. Caylor elected as chair of B31.5 in August 2021 and they will meet in February 2022.
- b. Caylor presented paper on refrigeration piping stress analysis at the 2021 RETA Conference in November 2021.
- c. B31.5-2022 scheduled for publication by December 2022.
- d. ASME B31G has been informally used as RAGAGEP for safety factor in determining fitness-for-service (FFS), but this is now being reviewed in comparison with API 579/ASME FFS-1. Initial conclusions were expected for the 2022 Winter Conference, but, have been delayed until after B31.5-2022 is completed.
- e. ASTM B1017/B1018 C19400 copper tubing will be handled as a Code case in B31.5 after B31.5-2022 is completed. Wieland AG (Germany) will furnish material data.

2. IIAR (Eric Smith).

- a. Industry response and response to IIAR CO2-2021? The standard is published and available through the IIAR website. It is on a 5 year cycle.
- b. IIAR Annual meeting will be held in March of 2022 in Savannah, GA.
- c. IIAR 3 (Valves) is being rewritten and hope to be published in 2022.

3. ASHRAE 15 (Greg Scrivener).

- a. Greg was not present at the meeting however, Eric Smith, Danny Halel and Doug Scott commented on the status.

4. Insulation societies (NAIMA?) and TC 10.1 POC?

- a. Gordon Hart and Willis Brayman was asked if there are any societies that we need to liaison with; ASTM C16 was mentioned as well as

- 1) National Insulation Association(NIA) <https://insulation.org/>
  - Generated a below-ambient insulation VIMEO pre-recorded instructional presentation with voice-over narration. Very applicable to TC10.1 subject matter: <https://vimeo.com/showcase/8617063>
  - Insulation Outlook magazine routinely has articles related to industrial and commercial installations and base information related to providing effective Refrigeration System insulation installations. <https://insulation.org/io/>
  - Membership Directory -- <https://www.programs.insulation.org/Scripts/4Disapi.dll/4DCGI/directory/CoMemberSearch.html?MenuKey=nomenu>
- 2) Midwest Insulation Contractors Association <https://micainsulation.org/>
  - North American Commercial and Industrial Insulation Standards Manual(NACIIS Manual, 9<sup>th</sup> Ed.) <https://micainsulation.org/standards-manual/>
  - Section 2.8 – Summary: Insulation Materials & Applications within the General Temperature Ranges – Discussion of Chilled Water, Commercial and Industrial Refrigeration(Refrigerant independent), and - - Cryogenic Considerations
  - Section 9.4 – Refrigeration and Low Temperature Insulation (-49°F to +60°F)

- Section 11 – Cryogenic Systems, 55 pages of introductory information and installation detail, covering pipes, piping specialties, pipe supports, vessels, pumps/equipment, contraction joints, terminations, in single and multi-layer applications, with a special emphasis on properly vapor-sealing at critical points.  
The manual has a significant amount of detail that applies to all insulated mechanical systems, with added detail that covers below-ambient installations.

Thank you to Darrell Peil for the above information.

## **VI. Membership Subcommittee Report (Jim Caylor).**

- A. Six (6) officers including five (5) voting members.
  - 1. Danny Halel has agreed to serve as TC 10.1 Secretary – many thanks!
- B. Ten (10) voting members until June 30, 2022.
  - 1. Adnan Ayub, Robert Neely & Darrell Peil roll OFF after June 30, 2022.
  - 2. Seven (7) voting members after June 30, 2022.
  - 3. Martin Timm, Alex Cusick, Danny Halel, Wayne Borrowman and Kartik Patel showed interest in joining.
- C. Twenty-four (24) provisional corresponding members.
- D. Eighty-five (85) corresponding members.
- E. Total of (119) members.
- F. Over sixty (60+) members have not attended a meeting virtually or in person in the last three years and will be removed from the roster after the 02/01/2022 meeting.

## **VII. Handbook Subcommittee Report (Jim Caylor).**

- A. Need a volunteer for this position!
- B. Handbook chapters.
  - 1. Chapter 2 (NH3) submitted with revisions by Kent Anderson & Lane Loyko. There is a Whitepaper authored by IIAR and ASHRAE that is presently being written. The Refrigeration Committee at this point is the ASHRAE lead.
  - 2. Chapter 3 (CO2) submitted with revisions by Jim Caylor.
  - 3. Chapter 4 (Liquid Overfeed Systems),
  - 4. Chapter 5 (Component Balancing),
  - 5. Chapter 13 (Secondary Coolants),
  - 6. Chapter 45 (Concrete Dams),
  - 7. Chapter 46 (Chemical Industry),
  - 8. Chapter 47 (Cryogenics),
  - 9. Chapter 48 (Ultralow Temperature) and
  - 10. Chapter 49 (Biomedical Applications) were submitted with no changes.

## **VIII. Research Subcommittee Report (project author/leader). Doug Scott**

- A. RP-1703 Performance of Vapor Retarder Systems Used on Mechanical Insulation.
  - 1. Co-sponsor with TC 1.8 (Lead Committee).
  - 2. Charley Petty (lead), Gordon Hart and Jim Young (contributors).

3. This is now RP-1703 and was approved in early 2020. TC 1.8 is the lead TC A contractor has been selected and work began in 2021-Q4 with a tentative completion of 10/31/2022.
- B. RP-1721 Oil Return and Retention in Unitary Split System Gas Lines.
1. Co-sponsor with TC 8.11.
  2. Gordon Struder is on PMS.
  3. RP-1721 is in the fifth and final year of the project, with remaining work to include spot tests with POE32 using R410A, R32 and R1234ze(E)(A2L). Final report is due in March 2022.
  4. Gordon Struder to update.
- C. RTAR-1871 Hygrothermal Modeling of Below Ambient Pipe Insulation Systems in Buildings and Refrigeration.
1. Co-sponsor with TC 1.8 (Lead Committee).
  2. Manfred Kehrer and Gordon Hart are authors.
  3. This will be approved after data are received from RP-1703. Presently on hold until data is received per ASHRAE Staff.
- D. RTAR-1513 (old) Liquid/Vapor Separation in Vessels.
1. Originated in TC 10.1.
  2. Work continues and CO2 will be included.
  3. Doug Scott to update. No new data – Research Funding is low.
  4. At this point the RTAR is on hold. There are many factors that enter into this, particularly with compressors, there are many variables and difficult to write an RTAR because of its size.
- E. Decarbonization-Electrification RP.
1. Doug Scott (Igor Vaisman, Greg Scrivener, Don Cleland, Bruce Griffith)?
  2. High temperature heat pumps Doug Scott reported that there has been some movement – much information has been gathered a PTAR is being developed. The next meeting will be in early April.

## **IX. Programs (Tom Wolgamot)**

- A. A joint Section 10 Program meeting was held, collaboration is the focus, all 4 TC's were in attendance.
- B. Old TC 10.1 topics.
1. Effects of packaging.
  2. HT heat pump applications.
  3. CO2 trans-critical component sizing.
  4. Ice rink system comparison (probably for new TC 10.2).
  5. Commercial propane system application (Whole Foods?).
  6. Small ammonia forum.
  7. Greenhouse loads (probably for new TC 10.2).
  8. Std 15 requirements for A2L ventilation requirements (Greg Scrivener).
  9. R-507 systems.
  10. Refrigerant conversions.

### C. Possible new topics

1. Experience and strategies with new refrigerants.
2. Thermal Energy Storage.
3. Building Resilience.
4. Decarbonization.
5. Pending refrigerant regulations.
6. Refrigerant retrofits.

### X. Old Business. .

#### A. Action Items.

1. Update roster and activity forms.
2. Review code of ethics and update website biographical information
  - a. Subcommittee officers needed
    - i. Handbook.
    - ii. Research projects.
    - iii. Webmaster.
3. Additional Action Items?

### XI. New Business.

#### A. TC 10.1 organization.

1. Goals.
  - a. Streamline committee organization where appropriate, but maintain refrigeration/piping efforts separately.
    - i. Handbook chapters.
    - ii. Research projects.
  - b. Retain general refrigeration presence in ASHRAE & specific piping emphasis.
2. Means.
  - a. Subgroup meetings with specific emphasis.
    - i. Piping.
    - ii. Insulation.
    - iii. Custom engineered refrigeration systems.
  - b. Overall committee meetings divided into time slots.
  - c. Temporary formations in and among committees for any given project.
  - d. Virtual meeting technology.

#### B. Piping capacity calculation tool for additional refrigerants (Andy Schoen to update).

1. Standardized ASHRAE tabular format.
2. Access and/or licensing requirement.

#### C. Hydrocarbon.

1. New chapter will be required.
2. Caylor began contact with Chengzhi Tang, but made no progress due to workload. Andy Schoen stated prior involvement with HC refrigerants and offered help. Mark Pearson also volunteered. Caylor to restart effort.
3. Refrigerant lines velocities etc.

Andy shared how he has developed software (Excel) that will go to his website and download info from NIST Refprop. It can be found on his website **hvacradvisors.com** Click on Apps section.

3. ASHRAE Std 15
4. Propane (290).
5. Isobutane (600a).

D. Research information should be posted on Basecamp.

**XII. Next Meeting: Toronto, ON, CA; 06/25-29/2022.**

- A. <https://www.ashrae.org/conferences/2022-annual-conference-toronto>.
- B. Virtual and face-to-face!

**XIII. Adjourn**

The meeting was adjourned at 5:01 pm CT.

**ACTION ITEM LIST**

<b>AI #</b>	<b>DESCRIPTION</b>
LV - 1	Jim Caylor to check with Section Head Charlie Henck in reference to making Andy Schoen's work available to the TC and ASHRAE.
LV - 2	Jim Caylor to contact ASHRAE Staff and inquire on using Basecamp for TC 10.1. Others will be involved as Jim sees fit.

APPENDIX A – Attendance Sheet

Name	Status	In Attendance	Location
Jim Caylor	Chair – VM	Yes	On-Line
Adrian Ayub	Vice Chair - VM	No	
Tom Wolgamot	VM - PSC	Yes	In room Las Vegas
Greg Scrivener	VM - SSC	No	
Gordon Struder	VM - WM	No	
Willis Brayman	VM	Yes	On-Line
Robert (Alan) Neely	VM	No	
Darrell Peil	VM	Yes	On-Line
Heather Sharif	VM	Yes	In room Las Vegas
Christopher Williams	VM	No	
5 of 10 voting members in attendance – quorum not achieved			
Cameron Klein	PCM	Yes	On Line
Michael Peterson	PCM	Yes	In room Las Vegas
Bent Wiencke	PCM	Yes	On-Line
Danny Halel	Secretary – NVM	Yes	On-Line
Adam Shirley	CM	Yes	In room Las Vegas
Steve Sanders	CM	Yes	On-Line
John Gallaher	CM	Yes	In room Las Vegas
Andy Schoen	CM	Yes	In room Las Vegas
Doug Scott	CM	Yes	In room Las Vegas
Martin Timm	CM	Yes	On-Line
Adam Shirley	CM	Yes	In room Las Vegas
Bruce Griffith	CM	Yes	On-Line
Eric Ramon	CM	Yes	On-Line
Nick Shockley	CM – Handbook Liaison	Yes	On-Line
Mark Pearson	CM	Yes	On-Line
Kartik Patel	CM	Yes	On-Line
Claude Wilkinson	CM	Yes	On-Line
Chengzhi Tang	CM	Yes	On-Line
Gordon Hart	CM	Yes	On-Line
Alec Cusick	CM	Yes	On-Line
Lewis Loyko	CM	Yes	On-Line
Charlie Henck	Section Head	Yes	On-Line