



**180 Technology Parkway – Peachtree Corners, GA 30092  
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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 10.1 DATE June 28<sup>th</sup>, 2021

TC/TG/MTG/TRG TITLE Custom Engineered Refrigeration Systems, Piping, Controls and Accessories

DATE OF MEETING June 22<sup>nd</sup>, 2021 LOCATION Online

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Caylor	2021	Anderson	2021	
Peil	2020	Ayub	2020	
Scott	2019	Blahey	2019	
Scrivener	2021	Brayman	2021	
Struder	2021	Neely	2020	
Williams	2021	Sharif	2021	

**DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:**

TAC Section Head: Charlie Henck	SHx@ashrae.net Where x is the section number
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	See ASHRAE email alias list for needed addresses.
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

## I. Preliminaries.

- A. **Chair called the meeting to order at 1:05 PM EDT.** The meeting agenda was projected and emailed.
- 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. See <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.
- C. Self-introductions & attendance sheet (taken from the GoToMeeting login information).
- D. Verify quorum – voting members:
  - 1. Jim Caylor V/23 Chair
  - 2. Doug Scott V/21 Research Subcommittee Chair
  - 3. Greg Scrivener V/23 Standards Subcommittee Chair
  - 4. Gordon Struder V/22 Webmaster
  - 5. Darrell Peil V/23
  - 6. Christopher Williams V/23

## II. Review and approval of 2020 Annual Conference draft minutes.

- A. Minutes of old TC 10.1 meeting on 01/25/2021 available and opened for discussion. No comments or objections. Motion to approve draft meeting minutes by Doug Scott and seconded by Greg Scrivener. Motion passed 6/0/0.
- B. Minutes of old TC 10.3 meeting on 01/26/2021 not available (secretary unavailable and no minutes received) but opened for discussion. No comments or objections. Motion to approve draft meeting minutes by Jim Caylor and seconded by Gordon Struder. Motion passed 5/0/0 (Chris Williams abstaining).

## III. Chair's Report (Jim Caylor).

- A. TC Reorganization.
  - 1. TC 10.1 and TC 10.3 voted to merge on 11/26/2020 and are now the new TC 10.1.
  - 2. TC 10.2, 10.5 & 10.8 voted to merge on 01/08/2021 and are now the new TC 10.2.

## IV. Liaison Reports.

- A. Section 10 Head – Charles Henck ([SH10@ashrae.net](mailto:SH10@ashrae.net)).
  - 1. Revisions of ASHRAE Handbook chapters are due now. Program submissions for ASHRAE 2022 Winter Conference are due August 2<sup>nd</sup>, 2021.
  - 2. Virtual meetings at the beginning of June 2021 were arranged for all 3 subcommittees; however, there were no attendees. This will be done again for the ASHRAE 2022 Winter Conference in Las Vegas and hopefully get attendees.
  - 3. Thanks to Jim Caylor for taking over as TC 10.1 chair
  - 4. Reminder that the TC activity form for TC 10.1 is due Friday 06/25/2021.

5. Announcement that lots of TC's using BaseCamp, with great success. Many TC's are starting to have meetings between winter & summer conferences. Reminder that virtual meetings between conferences are an option that ASHRAE is happy to facilitate.
6. Reminder that TC's can make motions to TAC and individuals can also submit questions directly to TAC.

B. Other Societies.

1. ASME (Jim Caylor).
  - a. ASME B31G has been informally used as RAGAGEP for safety factor in determining fitness-for-service (FFS) of corroded piping, but this is now being reviewed in comparison with API 579/ASME FFS-1. Initial conclusions should be available at our 2022 Winter Conference.
  - b. As of the 2018 version of ASME B31.3, food and beverage processing facilities are included within the document scope. Jim Caylor to investigate the potential interpretation of ASME B31.3 verbiage as including refrigerant piping in food and beverage processing facilities. Gordon Struder commented that HX components are addressed within ASME B31.5, and the ASME B31.3 committee might not be aware of that. Jim Caylor to communicate and report back.
2. ASTM (Jim Caylor).
  - a. Seamless copper tubing using C19400, which contains 2% of iron (CuFe2P), is now covered under two upcoming ASTM specifications which depart notably from the standard ASTM format.
  - b. ASTM B1017 ([ASTM B1017 - 21 Standard Specification for Seamless Copper-Iron Tube for Air Conditioning and Refrigeration](#)).
    - i. Lists annealed tubing wall thicknesses and associated pressure ratings derived from EN 14276-1. Formulas for calculating wall thickness in annealed and hard temper are given in an appendix.
  - c. ASTM B1018 ([ASTM B1018 - 21 Standard Specification for Seamless Copper-Iron Tube for Air Conditioning and Refrigeration Field Service](#)).
    - i. Lists tubing wall thickness for 80-bar and 130-bar pressures according to "...established wall thicknesses...in the North American...market". Both tables appear to be for hard temper and no calculation basis is given.
  - d. Danny Halel offered to assist Jim Caylor to investigate this issue.
3. IIAR (Danny Halel).
  - a. The ANSI/IIAR CO2-2021 is published and available.
4. ASHRAE 15 (Greg Scrivener).
  - a. Public review for comments was completed for ASHRAE 15 Addendum E.
  - b. A modification of ASHRAE 15 Section 7.2 regarding connected spaces was discussed and is out for public review.
  - c. ASHRAE 15 Addendum L is also currently out for public review, closing in May 2022.
  - d. There were also discussions on machine room definitions and classification of data centers as industrial facilities.
5. ICC (Jim Caylor).

- a. IMC 2021 and IFC 2021 are now published.

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

- A. These values are from an initial combination of legacy TC 10.1 and TC 10.3 rosters and are subject to change.
- B. Seven (7) officers including five (5) voting members.
  - 1. Steve Sanders has kindly agreed to serve as Secretary for this meeting, but the position is currently unfilled and **a volunteer is needed!** This position does not need to be a voting member.
- C. Twelve (12) voting members until June 30, 2021.
  - 1. Doug Scott, Kent Anderson and James Blahey roll OFF after June 30, 2021.
  - 2. Tom Wolgamot rolls ON after June 30, 2021.
  - 3. Ten (10) voting members after June 30, 2021.
- D. Twenty (20) provisional corresponding members.
- E. Eighty-three (83) corresponding members.
- F. Total of (117) members.

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

- A. RHB Ch 1 Halocarbon Refrigeration Systems.
  - 1. Reviewed 2019.
- B. RHB Ch 2 Ammonia Refrigeration Systems.
  - 1. Reviewed and approved 2019.
  - 2. Revised and sent for comments on 01/29/2021.
    - a. Brayman, Neely and Williams approved.
    - b. Anderson disapproved on 02/04/21 and was working with Lane Loyko on comments to hydraulic shock and safety sections.
    - c. No response from Scrivener, Sharif and Struder.
    - d. Jim Caylor issued a reminder that there's a hard deadline of July 31<sup>st</sup> for handbook revisions. Chapter 2 was already sent out for revisions but still awaiting a reply from Kent Anderson. If no written reply from Kent Anderson on hydraulic shock is received by end of June, the Refrigeration Handbook Chapter 2 will have to go-out without revisions. Lane Loyko will email Jim Caylor and Kent Anderson his latest revisions.
- C. RHB Ch 3 Carbon Dioxide Refrigeration Systems.
  - 1. Revised and sent for comments on 02/01/2021.
    - a. Brayman, Neely, Scrivener, Sharif and Williams approved.
    - b. No response from Anderson, Peil and Struder.
- D. Refrigerant piping references added to composite ASHRAE Handbook index as per Scott Fisher.
- E. Old TC 10.1 responsible for chapters 4, 5, 13, 45, 46, 47, 48, 49 & 50. Dan Dettmers was Handbook Subcommittee Chair.
  - 1. Doug Scott commented that Refrigeration Handbook Chapter 5 has nothing wrong, but future work might be desired to do better differently by approaching the subject matter

from a more modern point of view. Motion to approve RHB Ch 5 as-is without revisions by Greg Scrivener and seconded by Doug Scott. Motion passed 6/0/0.

## VII. Research Subcommittee Report (project author/leader).

- A. WS-1703 Performance of Vapor Retarder Systems Used on Mechanical Insulation.
  - 1. Co-sponsor with TC 1.8.
  - 2. Charley Petty (lead), Gordon Hart and Jim Young (contributors).
  - 3. *This is now RP-1703 and was approved in early 2020. A contractor has been selected and funding is currently scheduled for September 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.*
- C. RTAR-1862 Determining the Impact of Sealing Hot Insulation System Metal Jacketing Joints on Water Intrusion and Retention in the System.
  - 1. Jim Young is author.
  - 2. *Jim has retired and the other interested technical committee, TC 1.8, has dropped the effort. Jim has recommended also removing it from TC 10.1's agenda.*
- D. RTAR-1871 Hygrothermal Modeling of Below Ambient Pipe Insulation Systems in Buildings and Refrigeration.
  - 1. Co-sponsor with TC 1.8.
  - 2. Manfred Kehrer and Gordon Hart are authors.
  - 3. *This will be approved after data are received from RP-1703.*
- E. RTAR-1513 (old) Liquid/Vapor Separation in Vessels.
  - 1. Originated in TC 10.1.
  - 2. Doug Scott and Lane Loyko are working on this effort.
  - 3. *Work continues and CO<sub>2</sub> will be included.*
- F. Decarbonization-Electrification RP
  - 1. PTAR path being considered instead of RTAR. Doug Scott to set-up a call on further discussion on this and include Jim Caylor.

## VIII. Programs (Tom Wolgamot)

- A. Reminder that proposals for seminars & sessions due August 2<sup>nd</sup>, 2021. Proposals for a program generally just need a single paragraph abstract describing the program discussion and three questions that attendees can answer as a result of attending. Program proposal authors will find out mid-September if their submission is accepted. Previously there were two proposals accepted – one by Eric Smith with an update on IIAR standards, and the other was a “back to basics/lessons learned” by Jeff Newell on sizing of transcritical CO<sub>2</sub> components & Greg Scrivener with lessons learned. There is great opportunity for similar seminars, as there's not a lot of avenues to train junior engineers.

## IX. Old Business.

- A. Review and update all Handbook chapters for the 2022 Refrigeration Handbook.
  - 1. Ch 1 Halocarbon Refrigeration Systems.
  - 2. Ch 2 Ammonia Refrigeration Systems.
  - 3. Ch 3 Carbon Dioxide Refrigeration Systems.
  - 4. Ch 10 Insulation Systems for Refrigerant Piping.
- B. Action Items.
  - 1. Update roster and activity forms.
  - 2. Review code of ethics and update website biographical information.
  - 3. Additional Action Items?

## **X. New Business.**

- A. Discussion on 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.
    - e. Dan Dettmers commented that it may be beneficial to hold subgroup meetings outside of winter and summer conferences, and potentially meet with the new TC 10.2 as well.
    - f. Danny Halel commented that TC's 3.1, 3.2, 3.3, 3.4, and 3.8 have used this model for several years with great success, finding that less time is spent debating points during winter and summer meetings since work is done during meetings in-between.
    - g. Jim Caylor to initiate a meeting in the first half of July 2021 as a first step for TC 10.1.
- B. Piping tables for additional refrigerants.
  - 1. *f*-gas.
    - a. Added as tables only or with minimal verbiage at end of ch R1 *Halocarbon Refrigeration Systems* in the same manner as ch F30 *Thermophysical Properties of Refrigerants*.
      - i. Chapter name change?
    - b. Quantity.

- c. Shelf life.
  - d. By manufacturer or OEM organizations?
- 2. Standardized ASHRAE tabular format.
- 3. Multiple table creators subject to external confirmation using independent calculation methods with result variation < 0.1%.
- C. Hydrocarbon.
  - 1. New chapter will be required.
  - 2. Stakeholders.
    - a. Commercial: merchandisers, C-stores, markets.
    - b. Industrial: gas reliquefaction.
    - c. OEM input.
    - d. ASHRAE Std 15?
  - 3. Propane (290).
  - 4. Isobutane (600a).
  - 5. Danny Halel commented that IIAR is in the process of writing a hydrocarbon standard.
  - 6. Andy Schoen commented that he was involved in RSES's efforts with hydrocarbon refrigerants some years ago.
  - 7. Chengzhi Tang offered to help in this regard – anyone with interest and willingness to help to email Jim Caylor.

**XI. Next Meeting: Las Vegas, NV – 01/29/2022-02/02/2022.**

- A. [2022 ASHRAE Winter Conference | ashrae.org](https://www.ashrae.org/conferences/2022-ashrae-winter-conference).
- B. Virtual and hopefully face-to-face!

**XII. Motion to adjourn the meeting by Doug Scott and seconded by Jim Caylor. Motion passed 6/0/0.**

**XIII. Attendance Sheet.**

- 1. Jim Caylor
- 2. Ali Behfar
- 3. Andy Schoen
- 4. Bent Wiencke
- 5. Bruce Griffith
- 6. Cam Klein
- 7. Charlie Henck
- 8. Chengzhi Tang
- 9. Chris Williams
- 10. Dan Dettmers
- 11. Danny Halel
- 12. Darrell Peil
- 13. Dave Snyder
- 14. Doug Scott
- 15. Gordon Struder
- 16. Greg Scrivener
- 17. Jim Young
- 18. John Gallaher

19. John Scott
20. Lewis Loyko
21. Martin Timm
22. Nick Shockley
23. Steve Sanders
24. Tom Wolgamot
25. Wayne Borrowman