

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.**

1791 Tullie Circle, N.E., Atlanta, GA 30329
404-636-8400

TC/TG/TRG MINUTES COVER SHEET

**Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within
60 days following the meeting.**

These minutes have been approved by this committee.

TC/TG/TRG NO TC 3.1

Date 26 January 2015

TC/TG/TRG TITLE Refrigerants and Secondary Coolants

DATE OF MEETING 26 January 2015

LOCATION Chicago, IL

| MEMBERS PRESENT | YEAR APPTD | MEMBERS ABSENT | YEAR APPTD |
|---|-----------------------|-----------------------|-----------------------|
| Mark McLinden (Chair) – voting | 2014 | | |
| Steve Kujak (Vice Chair/Research) – voting | 2014 | | |
| Warren Clough (Secretary) – voting | 2014 | | |
| Chris Seeton (Program) – voting | 2012 | | |
| Sean Cunningham (Webmaster) – voting | 2013 | | |
| Kevin Connor (Handbook) – voting | 2011 | | |
| Ganesan (Sonny) Sundaresan – voting | 2014 | | |
| Felix Flohr (non-quorum) | 2012 | | |
| Alice Riemer (non-quorum) | 2012 | | |
| | | | |
| | | | |
| Other Officers & Related | | | |
| Dave Wilson (Standards) | 2012 | | |
| | | | |

| Corresponding Members and Guests | | |
|---|---------------------|-------------------------------|
| Debra Kennoy (CM) | Julie Majurin (CM) | Ted Li |
| Amir Jokar (CM) | Shitong Zha (CM) | Eugene Chen |
| Peter Coll | Kapil Singhal (CM) | Mary Opalka |
| Barbara Minor (CM) | Amanda Hickman | Mark Spatz (RAC liason) |
| Chuncheng Piao (CM) | Scott MacLeod (CM) | Jay Kohler (TAC Section Head) |
| Samuel Yana Motto | Osami Kataoka (CM) | |
| Paul Papas | Knut Petry (CM) | |
| Hans-Joachim Kretzschmar | Kenji Takizawa (CM) | |
| Sam Cantrell (CM) | Harrison Skye | |
| Marc Scancarello (CM) | Samira Elkhamlichi | |
| Amy Paul | | |

KEY CONTACTS

| | |
|---|---|
| SPLS Liaison* | Janice Peterson |
| TAC Chair: | Eric Adams |
| TAC Section Head: | Jay Kohler |
| All Committee Liaisons As Shown On TC/TG/TRG Rosters: | RAC Research: Mark Spatz Standards: Malcolm Knight Handbook: Sheila Hayter Chapter Technology Transfer: Stephen Piccolo ALI/PDC: Darin Nutter |
| Manager Of Standards* | Stephanie Reiniche |
| Manager Of Research & Technical Services | Michael R. Vaughn |

*receives a copy of the TC 3.1 meeting minutes

MEETING MINUTES

1. CALL TO ORDER (M. McLinden, Chair)

- A. Chair called the meeting to order at 4:18 PM and attendees introduced themselves.
- B. Establishment of a quorum – All voting members were present.

Voting members for this meeting (total 9):

Warren Clough – present
Kevin Connor – present
Sean Cunningham - present
Felix Flohr – present (non-quorum)
Steve Kujak - present
Mark McLinden – present
Alice Riemer – present (non-quorum)
Chris Seeton – present
Sonny Sundaresan – present

2. AGENDA REVIEW

No revisions were noted to the agenda.

3. APPROVAL OF SEATTLE, JUNE 2014 MEETING MINUTES

Motion to approve draft minutes with noted corrections below was made by Kevin Connor and seconded by Alice Riemer.

Motion passed: 7/ 0/ 0/ 9 [CNV]. (For / Against / Abstain / Total [Chair Voting [CV] or Chair Not Voting [CNV]])

Felix Flohr and Alice Riemer did not attend the Seattle meeting. Their names will be moved to “absent.”

4. CHAIRMAN’S ANNOUNCEMENTS (M. McLinden, Chair)

A. Section 3 Meeting Report

- No Refrigeration track for June 2015 Atlanta meeting (to be discussed further under Program).
- The Hightower Award and Service to ASHRAE Research Award went to members of TC 4.3
- The Top TC for Section 3 Award went to TC 3.4
- All members are encouraged to abide by the ASHRAE code of ethics
- The “Electronic and Present” option for remote participation at TC meetings is still in beta testing
- Website is up to date
- Everyone is encouraged to update their bio, especially to specify their employment discipline

B. Symposium on Thermophysical Properties

- Refrigerant sessions to be presented at the 19th Symposium on Thermophysical Properties at Boulder Colorado, June 21-26, 2015; a total of 31 abstracts have been accepted, including 15 talks and 3 posters related to the HFO refrigerants

C. Roster Review

Summary of TC3.1 membership and changes, effective July 1st 2014

| <u>Position</u> | <u>Members</u> |
|------------------------------|-----------------------------|
| Chair | Dr Mark O McLinden, PhD (V) |
| Vice Chair | Mr Stephen Kujak (V) |
| Secretary | Mr Warren Clough (V) |
| Research Subcommittee Chair | Mr Stephen Kujak (V) |
| Standards Subcommittee Chair | Dr David P Wilson, PhD (NV) |
| Program Subcommittee Chair | Dr Christopher J Seeton (V) |
| Handbook Subcommittee Chair | Mr Kevin C Connor (V) |
| Webmaster | Mr Sean Cunningham (V) |
| Member Non-Quorum | Mr Felix Flohr (V) |
| Member Non-Quorum | Mrs Alice Riemer (V) |

4. RESEARCH (Steve Kujak)

A. Report from Research Subcommittee Chairs Meeting

- There are currently 59 active projects totaling \$11 M
- There are 5 new projects since July
- 15 are out for bid
- There are no holds due to funding

B. Status of current research projects

| | <u>Project Title</u> | <u>Status</u> | <u>PMS</u> | <u>Comments</u> |
|------------------------------|---|------------------|--|---|
| ASHRAE Completed research | 1584-RP: Assessment of Alternative Approaches to Predict Burning Velocity of a Refrigerant | Project Complete | Deb Kennoy-Lead B. Minor R. Richards S. Cunningham X Wang K. Takizawa | Final report has been approved by the TC. Paper has been accepted by HVAC&R Research J. and will be presented at Atlanta meeting. Debbie Kennoy to submit final closing document. |
| AHRTI Completed research | 9005- Fractionation testing and error analysis for refrigerant blends in support of SSPC34 SPC-177P title is: MOT Fractionation Measurement of Refrigerant Blends | Work Complete | R. Richards-Lead B. Minor S. Kujak M. Scancerello X Wang M. McLinden | Final report approved and posted on AHRI website AHRTI PMS R. Richard, B. Minor S. Kujak, M. Scancerello, X. Wang M. McLinden |

C. Ongoing Projects

| <u>Project Title</u> | <u>Status</u> | <u>PMS</u> | <u>Comments</u> |
|---|--------------------------|---|--|
| 1717-RP - Improve Accuracy and Reproducibility of ASTM-E681 Flammability Test Method for Flammability Measurement of 2L Flammable Refrigerants | Out for bids | Deb Kennoy-Lead B. Minor R. Richards S. Cunningham X Wang S. MacLeod | 3 Contractor bids received, PES met in Chicago to recommend contractor PES subcommittee: D. Kennoy, B. Minor S. Cunningham, Scott MacLeod, Bob Richard X. Wang |
| Risk Assessment Investigations to Develop Alternative Acute Toxicity Classification Approaches to the A or B Chronic Toxicity Classification of Refrigerants Used By ASHRAE Standard 34 | RL Review WS Complete | S. Kujak-Lead Deb Kennoy G. Rusch G. Jepson C. Seeton | Work statement prepared and reviewed by Research. Subcommittee. Some revisions needed Authors to confer with Mark Spatz to update. |

The consideration of the bids on 1717-TRP was moved to the end of the meeting and discussed in an executive session.

The work statement on toxicity classification will be circulated to the TC for comments and then for a letter ballot.

D. Proposed RTARs and Ideas

| | Project Title | Comments/Status |
|--------------------------------|---|--|
| Accept for further development | Ignition Potential from Electrical Devices in Commercial and Residential Applications using 2L Refrigerants" | RTAR being developed Warren Clough & Paul Papas submitted idea; RTAR team: W. Clough (Lead), M. Scancarello, S. Sundaresan, B. Minor, E. Smith Try to finalize the RTAR by March for letter ballot |
| Accept for further development | Effect of humidity on burning velocity of low GWP HFC's | To support ISO817 resolution Initial RTAR has been drafted; to be sent out for TC comment. RTAR team: Debbie Kennoy-lead, Bob Richards. Julie Majurin, Tom Leck, Els Baert |
| Idea | Study of toxicology effects of combustion of flammable Refrigerants | Submitted by Eric Smith Discussion was that combustion products are not germain since standards set limits such that no combustion will occur. |
| Accept for further development | Development of a standardized Standard 34 RCL calculation tool | Submitted by Bob Richards Add ISO 817 calculation as well as a selection SSPC 34 Toxicity moved to support and it is needed RTAR developed, small project, Send to members and provide comments, March (Letter Ballot) |

The three RTARS in preparation, as noted above, will be circulated to the TC by March 2015 for comments, followed by a letter ballot.

E. ASHRAE Research Liaison Report

Mark Spatz stressed that RTARs should be submitted first prior to a Work Statement.

5. **HANDBOOK** (Kevin Connor)

The next revision will be for the 2017 edition.

Three Chapters need to be revised by June 2016.

- Chapter 29 (Chair—Barb Minor)
- Chapter 30 (Chair—Mark McLinden)
- Chapter 31 (Chair—Kevin Connor)

6. **PROGRAM** (Chris Seeton)

A. Current Program Sessions (Chicago)

1. Monday, 11:00, Code and Safety Standard Requirements: Working with 2L Low-GWP Refrigerants, chair: R. Richard
2. Tuesday, 11:00, International Codes and Standards Issues Impacting use of A2L Refrigerants in Unitary Heat Pump and Air-Conditioning Equipment (co-sponsor with TC 8.11), chair: V. Baxter

B. Future Potential Sessions (Seminars, Forums, and Workshops)

Atlanta (June 2015)

TC 10.7 to lead, TC 3.1 to co-sponsor following seminars:

1. "Improving the efficiency of low-GWP refrigerants in commercial equipment"
2. "Practical use of R404A alternatives in commercial applications" Resubmitted from Chicago

*Motion to approve Program was made by Chris Seeton and seconded by Sean Cunningham
 Motion passed: 8/ 0/ 0/9 [CNV] (For / Against / Abstain / Total [Chair Voting [CV] or Chair Not Voting [CNV]])*

Orlando (January 2016)

TC3.4 to lead, TC 3.1 co-sponsor (approved conditionally pending TC3.4 approval)

1. “Synthetic Lubricants: Making the Commercialization of Low GWP Refrigerants a Reality”

*Motion to approve Program was made by Chris Seeton and seconded by Sonny Sundaresan
 Motion passed: 8/ 0/ 0/9 [CNV] (For / Against / Abstain / Total [Chair Voting [CV] or Chair Not Voting [CNV]])*

Future program ideas:

1. “System efficiency impacts of low-GWP refrigerants: Are we compromising with efficiency?”
2. Leak detection technologies and sensors; potential co-sponsor with TC 3.8
3. Results from AREP II testing (Alternative Refrigerant Evaluation Program, organized by AHRI—Air Conditioning, Heating, and Refrigerating Institute)
4. Workshop on A/B toxicity classification. (Wait until proposed research project is started; give an update on progress and get feedback.)

There will be a “Refrigeration” program track at the Atlanta meeting, but not at the Orlando meeting (see listing below). This generated much discussion at the Sunday morning TC Chairs meeting.

5. Program tracks for Atlanta and Orlando

| June 2015—Atlanta | January 2016—Orlando |
|--|---------------------------------|
| Systems and Equipment | Systems and Equipment |
| Fundamentals and Applications | Fundamentals and Applications |
| Research Summit | Design Build |
| Refrigeration | International Design |
| Building Operation, Maintenance and Commissioning | Standards, Guidelines and Codes |
| Indoor Air Quality | Cutting Edge Technologies |
| Modeling Throughout the Building Life Cycle | The Great Debate |
| High Performance Buildings | Modern Residential Systems |
| Moving Advanced Energy Design Guidance to the Mainstream | |

7. STANDARDS (Dave Wilson)

A. ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants* (D. Wilson)

- Five refrigerant classification applications were submitted for the Chicago meeting.
- Standards Committee approved six addendas from the Seattle meeting
- Three Continuous maintenance comments still being resolved with the commenter.
- Proposed changes to the IMC (International Mechanical Code)—24 refrigerants added or changed.
- Tolerance and accuracy of properties in refrigerant applications being looked at.
- Submitting a CM proposal for CO₂
- Setting LFL rules around WCF and WCFF (i.e., is LFL determined at the WCF or WCFF?)

- A change in the definition of interest categories for committee membership was endorsed by SPLS and will become effective July 2015.

B. Guideline 6 (S. Kujak)

- Complete and submitted. ASHRAE will review and it will go out for public review.

C. SPC-177P, *MOT Fractionation Measurement of Refrigerant Blends* (R. Richard)

- Publication/Public Review Draft submitted to ASHRAE
- This document was originally intended to be a method of test. It has now been changed to a Guideline, and a new number will be assigned.

D. ISO Standard 817, *Refrigerants –Designation and Safety Classification* (S. Sundaresan)

- Published 2014.
- Meeting tomorrow (Tuesday) from 8am-12n to consider formation of a maintenance agency.
- Working Group 8 being formed—Method of testing for burning velocity

E. ISO Standard 5149, *Refrigeration Systems and Heat Pumps* (D. Wilson)

- Proposals for safety distances and charge limits

8. WEB SITE (Sean Cunningham)

- Added three presentations from previous ASHRAE meetings.
- Minutes and agenda are also posted

<http://tc31.ashraetcs.org/meetings.html>

9. OLD BUSINESS

None

10. NEW BUSINESS

Sonny Sundaresan announced that Lee Burgett had passed away in December 2014, and wanted to recognize his many contributions to ASHRAE.

Executive Session

The TC went into executive session to consider the bids for 1717-TRP. Three bids were received, and the PES met earlier in the day to evaluate them and recommend a contractor.

Motion to recommend a contractor for 1717RP was made by the Research Subcommittee and seconded by Steve Kujak.

Motion passed: 8/ 0/ 0/9 [CV]. (For / Against / Abstain / Total [Chair Voting [CV] or Chair Not Voting [CNV]])

The identity of the recommended contractor is confidential until the contract is issued by ASHRAE.

11. MEETING ADJOURNED at 6:20 pm.