

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

1791 Tullie Circle, N.E./Atlanta, GA 30329
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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.)**

TC/TG/TRG NO TC 3.1 DATE 23 June 2008

TC/TG/TRG TITLE Refrigerants and Secondary Coolants

DATE OF MEETING 23 June 2008 LOCATION Salt Lake City, UT

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Barbara Minor (chair) -Voting	07/2006	Robert Richard – CM	07/2000	Steve Kujak - Guest
Sunil Nanjundaram (secretary, webmaster) –Voting	07/2006	Richard Jacobsen – CM	07/1990	Francisco Montalvo – Guest
Sonny Sundaresan(journal) -CM	07/2006	Koichi Watanabe – CM	07/2003	Umar Kokhar- Guest
Jim Lavelle (standards) – CM	07/2006	Michael Blanford –CM	07/2001	Robert Richard – Guest
Samuel Sami –Voting	07/2002	Kenneth Lilje –CM	07/2001	John Senediak – Guest
Sean Cunningham (vice chair) - Voting	07/2006	Alan Cohen –CM	07/1999	Thomas Leck - Guest
Don Bivens (Research) -CM	07/2006	Barry Fields – CM	07/2001	Marc Chasserot - Guest
Kevin Connor (Handbook) - Voting	07/2005	John Judge – CM	07/2001	Hans-Juadrim Kretzschmar – Guest
Bill Walter (Program) - CM	07/2004	Earl Clark –CM	07/2000	Robert Sperl - Guest
Mark McLinden - CM	07/2002	Karim Amrane –CM	07/1998	Kirsten McNeil - Guest
Tom Watson – CM	07/2004	John Andrepont –CM	07/2001	Georgi Kazachki - Guest
David Wilson – CM	07/2006	Rajiv Singh – CM	07/2006	Jim Crawford - Guest
Debra Kennoy – CM	07/2002	Nandini Mouli – CM	07/2003	Jose Ramirez - Guest
Robert Doerr –Voting	07/2006	Jing Zheng – CM	07/2003	
Steven Szymurski – CM	07/2000	Christoph Meurer - Voting	07/2004	

Cynthia Gage –CM	07/1992	Denis Clodic-Voting	07/2003	
MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL
Gustavo Rolotti – Voting	07/2004	Thomas Clemens – CM	07/2001	
		Osami Kataoka – CM	07/2006	
		Xiaomei Yu – Voting	07/2006	
		Bert McJimsey – CM	07/1998	
		Thomas Reinarts – CM	07/2002	
		Hank Bagheri (Handbook Liaison) –	07/2005	
		Andrzej Wesolowski – CM	07/1998	

DISTRIBUTION

<i>All Members of TC/TG/TRG plus the following:</i>	
TAC Section Head:	David Geary, Section 3
TAC Chair:	Patricia Graef
All Committee Liaisons As Shown On TC/TG/TRG Rosters:	Don Fenton -RAC Research Harvey Sachs -Special Pubs Claire Rampseck -Standards Brian Wandling -Program Hassan Bagheri -Handbook Benjamin Crowley -Chapter Technology Transfer Gordon Holness – Professional Development
Manager Of Standards Manager Of Research & Technical Services	Claire Ramspeck Mike Vaughn

1. CALL TO ORDER (Barbara Minor, Chair)

- A. Introductions of members and guests – Chair called the meeting to order at 4:15 p.m. and attendees introduced themselves.
- B. Agenda Revision/acceptance – Agenda was accepted as written (7-0-0).
- C. Establishment of a quorum – There were 7 voting members present out of 10 at the outset of the meeting, which did constitute a quorum.

2. APPROVAL OF 21 JANUARY 2008 MEETING MINUTES

Mrs. Minor noted that Mr. Mark Spatz and Mr. Sonny Sundaresan's names were misspelled in the minutes and noted they should be corrected. Motioned and seconded to approve the minutes as amended. Motion passed (7-0-0).

3. CHAIRMAN'S ANNOUNCEMENTS (Barbara Minor)

A. Report of Section 3 Meeting

Mrs. Minor noted that the theme of the 2009 ASHRAE convention in Chicago will be "Sustainability and the Environment". She also reported that letters were being sent from ASHRAE to employers of committee members thanking them for their company's participation in ASHRAE activities.

B. Roster review

Officers after the 2008 Ashrae spring meeting are Sean Cunningham (Chair), Dave Wilson (Vice Chair), Gus Rolotti (Secretary and Webmaster). Bill Walter (Program), Don Bivens (Research), Jim Lavelle (Standards), Kevin Connor (Handbook), Sonny Sundaresan (Journal Subcommittee Chair).

4. RESEARCH SUBCOMMITTEE (Don Bivens)

A. Report from Research Subcommittee Chairs Meeting

TC websites are a focus of ASHRAE and website setup help is available for individual TCs.

B. Completed Research Projects

- i) 1303-RP "Partitioning of Non-Condensables in Refrigerant Liquid and Vapor Phases" – Presentation at Salt Lake
- ii) 1308-RP "Identification and Evaluation of Working Fluids for High Temperature Heating Applications" – Presentation at Salt Lake

C. Ongoing Projects

This discussion was tabled until the executive session.

D. Research Plan

Motioned and seconded to approve the research plan as written. Motion passed (7-0-0).

5. **HANDBOOK SUBCOMMITTEE** (Kevin Connor)

A. Status Report

Handbook was published in 2005 and is scheduled to be published again in 2009. Updates for Chapter 19 are well under way and are on schedule for publication in 2009.

6. **PROGRAM** (Sam Sami)

A. New York City Program

i) Poster Session - Partitioning of Non-Condensables in Refrigerant Liquid and Vapor Phases

ii) Poster Session – Potential R-114 Replacement Refrigerants

B. Chicago, 24-28 January 2009: Program packages due first week in August 2008, Technical/Symposia papers due 1 April 2008.

i) Seminar – Retrofit of R-22 in A/C systems. Presenters include Jim Lavelle, Debra Kennoy and Tom Leck.

ii) Forum - Burning Velocities. Chairman Bill Walter.

iii) Seminar – co-sponsor a seminar to be titled “Fundamentals of CO₂”

C. Louisville, 20-24 June 2009: Program packages due first week of February 2009 Technical/Symposia papers due September 2008

i) Forum – ISO 817. Chairman Bill Walter.

D. Orlando, 23-27 January 2010: Program packages due first week in August 2009, Technical/Symposia papers due April 2009.

i) Seminar – ISO 817. Chairman Bill Walter.

ii) Seminar – Advances in Refrigeration and Secondary Coolants. Chairman Sam Sami.

iii) Seminar – Burning Velocity. Chairman Sonny Sundaresan.

Motioned and seconded to approve the program plan as written. Motion passed (6-0-0).

7. STANDARDS (Jim Lavelle)

A. SPC-177 for Measuring Fractionated Compositions of Refrigerant Blends (Bob Richard)

B. ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants* (Bill Walter)

4 addenda published (I, J, K, L). 10 received no comments so it is hoped that they will also be published shortly.

C. ISO Standard 817, *Refrigerants – Number Designation* (Bill Walter)

NWIP submitted by Doug Tucker. Standard for review in one month and comments to be reviewed in Chicago.

8. WEB SITE

Website is on hold as ASHRAE staff is working to recreate the site.

9. OTHER BUSINESS

A. Report of Burning Velocity Ad hoc committee (Barbara Minor) – an ad hoc committee met and developed two draft RTARs listed in the Research Plan: “Assessment of Burning Velocity Test Methods” and “Assessment of Alternative Approaches to Predict Burning Velocity of a Refrigerant”. These RTARS were assigned Priority 1 and Priority 3 in the plan respectively.

10. NEW BUSINESS

A. TC 3.1 meeting times

The committee came to a consensus to reschedule the TC 3.1 meeting time to 3:45-5:45pm for future meetings.

11. MEETING ADJOURNED – 5:30 PM

APPENDIX 1

TC 3.1 RESEARCH PLAN (2007 – 2008 - 2009)
Status and action points at SLC meeting, 23 June 2008

ASHRAE Research Projects in Progress		
	Project Title	Comments/Status
2002-2003 Research Plan	Partitioning of Non-Condensable Gases In Refrigerant Liquid & Vapor Phases (1303-TRP) Including effects of Helium (from leak checking) on Refrigerant Properties	Project (Cavestri) started 7/1/04. Draft final report to be voted on at TC 3.1 meeting on 21 January 2008: <u>Minor</u> , Rolotti, Richard.
2003-2005 Research Plan	Identification And Evaluation Of Working Fluids For High Temperature Heating Applications. (1308-TRP)	Project completed. Stevonn Brown PI. <u>Minor</u> , Watson, Meurer, Pucciano (TC 9.4) – PMS. Poster presentation by Brown at Salt Lake City meeting.
2006-2008 Research Plan	WS 1507: Binary Refrigerant Flame Boundary Concentrations and databank for useful binary pairs in commercial refrigerants (60 C and 100 C). Identify standard flammable mixture for confirming accuracy of data from flame test apparatus. To aid assessment of new refrigerant blends for SSPC 34.	Sent out for bid proposals. Committee: Bob Richard, Debra Kennoy, Sonny Sundaresan, and Tom Leck as PMS.
2006-2008 Research Plan	WS 1484: Energy and Performance of Secondary Coolant Low Temperature Refrigeration Systems – Literature Research and Industry Review (includes model identification and verification vs operating systems)	Project underway. Eckhard Groll – PI, with Francisco Montalvo. Committee: Kevin Connor, Xiaomei Yu, and Elizabeth Jones. Support by TC 10.7. (David Hinde)
Priority	(Potential research projects)	
1	RTAR: Assesment of Burning Velocity Test Methods	To provide method evaluation and burning velocity data with error analysis for flammable refrigerants, to be used in future risk assessments and flammability classification methodology (as in ISO 817). Initial study committee: Minor, Wilson, Takizawa, Kataoka, and Kennoy.
2	Application Criteria for 2L (<10cm/sec) Refrigerants	With Standard 15 and ISO 5149. RTAR by Richard, Minor, Wilson, and Jim Crawford.
3	RTAR Assessment of Alternative Approaches to Predict Burning Velocity of a Refrigerant	To provide method evaluation and burning velocity data with error analysis for flammable refrigerants, to be used in future risk assessments and flammability classification methodology (as in ISO 817). Initial study committee: Minor, Wilson, Takizawa, Kataoka, and Kennoy.
	Burning Velocity Method Survey and Cost, Error,	To provide method evaluation and

	and Ease of Use Analysis	burning velocity data with error analysis for flammable refrigerants, to be used in future risk assessments and flammability classification methodology (as in ISO 817). On hold; ISO “expert” committee formed to make preliminary analysis of burning velocity test methods. Comments to be provided by ISO 817 committee. Review committee: Wilson, Takizawa, Kataoka, Minor
ON HOLD	Fractionation testing and error analysis for refrigerant blends (supports SSPC 34)	Continuing on hold until new SPC 177P (MOT Fractionation Measurement of Refrigerant Blends) committee determines if need for further research
Non-Prioritized Research Projects (long range)		
	Secondary fluids for refrigeration: Properties of low temperature secondary coolants such as formate/acetate water solutions.	Property data in vendor’s literature, but wide variation in values observed, possibly due to additives, and/or analytical procedures. ASHRAE Fundamentals chapter 19 being reviewed; to advise on need for further data.
	Identification of new fluids (phase change and sensible) for high temp/energy conversion applications (CHP, organic Rankine cycle)	Will re-evaluate after completion of 1308-TRP. Need to identify other TC’s with interest in CHP to determine fluid needs.
	Define equipment room criteria for use of refrigerants with low burning velocities (<10cm/sec)	RTAR to be prepared
	What are required properties needed to design equipment and rooms for use of flammable refrigerants	Check Std 15 revision for use of A2/A3 refrigerants
	Low GWP refrigerant properties, stability, and materials compatibility	Testing program; delay consideration for 6-12 months
	Ice slurry properties: Check with other TCs for need (TC 6.9 Thermal Storage)	Check TC 6.9 for need
	Lubricants for carbon dioxide	Check TC 3.4 – may be preparing RTAR