



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

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

**TC/TG/TRG DRAFT MINUTES COVER SHEET**

TC/TG/TRG TITLE: TC 8.7 Variable Refrigerant Flow

DATE OF MEETING: Monday, June 25, 2012 4:15 PM to 6:15 PM

LOCATION: Room: **008B (R)**, Convention Center, San Antonio TX

<b>MEMBERS PRESENT</b>	<b>YEAR APPTD</b>	<b>EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE</b> (Corresponding Members)	<b>EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE</b> (Guests)
Bob Jones	2010	Andrew Moore	Mike Stem
Paul Doppel	2010	David Markusz	Ana Ruiz
Brian Bogdan	2011	Bob Skorupsky	Jaeyoon Koh
Ron Domitrovic	2010	Dermott McMorrow	Myron Ramage
David Heckler	2010	Dominic Kolandayan	Aaron Smith
Ishtiaq A Chisti	2011	John Cummings	Steven Faulkner
Arturo Thur de Koos	2009	Pam Androff	Jon Lemmond
Chris Bellshaw	2007	John Vucci	Joe Wynn
Dunstan Macauley	2010	Jun Furuta	Osami Kataoki
		John Molar	Eric Johnson
		Mihaela Spulber	Keith Reihl
			Judith Jennings
			L. Spielvogel
<b>MEMBERS ABSENT</b>	<b>YEAR APPTD</b>		
Oswaldo de S. Bueno	2009		
Paul Solberg	2011		

## DISTRIBUTION

<i>All Members of TC/TG/TRG plus the following:</i>	
TAC Section Head: Steve Duda	<a href="mailto:SH8@ashrae.net">SH8@ashrae.net</a>
TAC Chair: Craig Way	<a href="mailto:TACCHAIR@ashrae.net">TACCHAIR@ashrae.net</a>
ASHRAE Manager of Technical Services:	<a href="mailto:MORTS@ashrae.net">MORTS@ashrae.net</a>
All Committee Liaisons as shown on TC/TG/TRG Rosters:	Program: <a href="mailto:PL8@ashrae.net">PL8@ashrae.net</a> Special Publications: <a href="mailto:PUBCHAIR@ashrae.net">PUBCHAIR@ashrae.net</a> Handbook: <a href="mailto:HBS8@ashrae.net">HBS8@ashrae.net</a> CTTC: <a href="mailto:CTTC8@ashrae.net">CTTC8@ashrae.net</a> RAC Research: <a href="mailto:RL8@ashrae.net">RL8@ashrae.net</a> PDC: <a href="mailto:PDCCHAIR@ashrae.net">PDCCHAIR@ashrae.net</a>
Additional Distribution	
ASHRAE Manager Of Standards	<a href="mailto:MOS@ashrae.net">MOS@ashrae.net</a>

### 1. Call to Order

Paul Doppel called meeting to order, June 25, 2012,

### 2. Welcome/Introductions

- a. **Roster:** We are set up to have a specific number of voting members, eleven (11) and unlimited number of corresponding members.
  - 9 of 11 voting members present—we have a quorum.
  - Present:
    - Ron Domitrovic
    - Paul Doppel
    - Dave Heckler
    - Robert Jones
    - Dustan Macauley
    - Ishtiaq A Chisti
    - Arturo Thur de Koos
    - Brian Bogdan
    - Chris Bellshaw
  - Absent:
    - Oswaldo de S. Bueno (International)
    - Paul Solberg
- b. Announcement made: To become a corresponding member—put your ASHRAE number on the attendance list being passed around & put CC next to your name.

### 3. Minutes Approval

- a. Minutes from Winter 2012: copies were passed out
- b. No discussion
- c. Motion to accept, and 2<sup>nd</sup>
- d. Vote 7-0-0 CNV

**4. Agenda Review/Updates:** Any adjustment to the agenda?

- a. Passed 7-0-0 CNV

**5. Chair's Comments** (Doppel)

- a. Chair breakfast (Paul)
- b. New groups formed in ASHRAE (interdisciplinary)
  - MTG.LOWGWP (low GWP refrigerants)
  - MTG.EAS (energy efficient air handling systems for non-residential buildings)
  - There is an MTG section on the web: [www.ashrae.org/standards-research--technology/technical-committees](http://www.ashrae.org/standards-research--technology/technical-committees)
- c. We had a seminar session (three presenters), appeared to go well. Significant interest is apparent in modeling. Still seems to be a hunger for additional info & assistance on VRF products.
- d. Starting in the winter—fees will be charged \$95 for session chairs & speakers.
- e. Upcoming specialty conferences:
  - Modeling—Atlanta
  - ASHRAE/NIST—Refrigerants Oct. 29-30 2012
  - Cold climate conference—Calgary, Nov. 12-14, 2012 (no VRF paper on the schedule...) We should keep an eye on the next one to have a VRF presence.
- f. Reminder that ASHRAE has a brand NEW LOGO - document is available on-line to explain – please use proper logo on correspondence.
- g. Thank you letters to employers can be requested.
- h. Future Meetings:

Dallas Meeting - January 26-30, 2013

- Conference site live: January 22, 2012
- Conference Paper abstract/Conf. Paper session proposals due March 19, 2012
- Conference Papers submitted for review are due early July 2012
- Dallas seminar and forum session proposals are due early August 2012
- Conference Website: <http://www.ashrae.org/dallas/>
  - Track 1 HVAC&R Systems & Equipment
  - Track 2 HVAC&R Fundamentals and Applications
  - Track 3 Standards, Guidelines, and Codes
  - Track 4 Energy Conservation
  - Track 5 Refrigeration
  - Track 6 Large Building Design
  - Track 7 Facility Management; Operations, Tech. and Energy Improvements
  - Track 8 – Special Interest Track

Denver Meeting - June 22-26, 2013

- Conference Site Live: June 20, 2012
- Conference Paper Abstract/Full Technical Papers due September 24, 2012
- Denver Seminar and Forum Session Proposals are due February 11, 2013
- Conference Website: <http://www.ashrae.org/denver/>

**6. Subcommittee Reports**

6.1 Handbook Chapter

- a. Doppel reported on the status of Handbook Chapter.
- b. Published as Chapter 18 in the 2012 Systems Handbook

c. Contributors were recognized for their great efforts.

## 6.2 Membership

a. Paul Doppel passed around July 1, 2012 roster for any updates:

- i. Paul Doppel will roll off as chair after San Antonio meeting.
- ii. Roll on as new voting members
  1. Jun Furuta
  2. Dermot McMorrow
  3. David Markuz
- iii. Looking for one more non-quorum member...

d. Brian Bogden has now shown up on the ASHRAE roster – standing ovation for Brian.

## 6.3 Program Afifi

a. **Program** chair is not here

b. Seminar 16 went well

c. Dallas: Seminar & Forum due date: Aug. 13.

- i. Suggestion that we put in for a Forum to discuss the chapter (Paul Doppel will head up)
- ii. Seminar suggestion on fundamentals of water source VRF (Ron to chair the session). People want to see case-studies...
- iii. Seminar on Commissioning VRF (Heckler to chair)
- iv. Suggestion to have a VRF tour as part of the Dallas meeting. Intertek & several manufacturers have sites there. (send this through the Dallas host committee—contact Judy Marshal on ASHRAE staff). Will be handled by Keith Reihl).

d. Denver, June 22-26

- i. Cold weather/altitude applications? (Seminar or Forum—chair by Pam)
- ii. Ish suggests conference paper sessions (comparisons of VRF systems)
- iii. Ish (Miyaka hotel)
- iv. Ron (EPRI field sites)

e. Seattle (summer), 2014

- i. Possible track dedicated to VRF
- ii. Up to 8-12 slots for forum, conference papers and seminars.
- iii. Sessions can be beginner/intermediate & advanced...

f. Dunston gave statistics on acceptance levels of Forums/seminars/conf papers. It's roughly 50%. Dunston suggests speaking to Track Chairs for guidance. Send abstracts to Track Chairs first before formally submitting.

g. Doppel will lead up abstract approvals for the TC (Ron D., Ish C., Dave Heckler & John Molnar will assist).

## 6.4 Research Macauley

a. An RTAR has been proposed, "Dispersion of Released Gaseous Refrigerants to Connecting Spaces via Transfer Openings"—asks ASHRAE research committee (RAC) to consider funding the research. If accepted by RAC, then a work statement is prepared, then it would be issued as an RFP to interested bidders.

b. Several questions on details of RTAR write up

- i. How would many situations of different building arrangements be handled?
- ii. There is one Japanese standard that aids this proposed research.

- iii. The word “permanent” was questioned—proposed “appropriate” instead.
  - iv. Questions as to the “worst case” refrigerant release and that some assumptions appear to assume catastrophic leaks in multiple spaces...is this realistic?
  - v. ASHRAE has a website of definitions (over 6000 terms are defined)
  - vi. “breathing zone” is not defined in this ASHRAE site. It should have a definition elsewhere—perhaps can be incorporated.
  - vii. -Question: Is there a known case of asphyxiation due to VRF refrigerant leak? None are known...
  - viii. -Discussion related to leakage rates. An instantaneous leak of the entire refrigerant volume is unrealistic. There needs to be an understanding of the maximum rate of leakage as it changes over time.
  - ix. -Suggestion to add some numbers regarding the growth of VRF systems.
- c. Paul Doppel. ASHRAE Standard 15—section 7 needs clarification. If TC 8.7 wants to have a seat at the RTAR table with SSPC 15, it needs to approve the RTAR, become a co-sponsor and participate in the research.
  - d. Motion to approve the RTAR with a modest change addressing the source, total available mass of refrigerant & rate of a leak (the RCL is consistent with the volume of connected spaces).
    - i. 2<sup>nd</sup>
    - ii. Discussion? (see above & below)
    - iii. Last bullet point has a typo: “opening size “is” a function of the...”
    - iv. Vote: passed 7-0-0 (Bob Jones left meeting early & did not vote).
  - e. Need a new research chair, Dunston Macauley is stepping down—John Molnar volunteered

6.5 Standards – Chris Bellshaw – defer to new business.

6.6 ASHRAE Learning Institute (ALI) - Thur De Koos – no update

6.7 Webmaster – update from Dominic Kolandayan

- a. Currently up-to-date
- b. There was some mention of the “best” website in Section 8: 8.3 was determined to be the best—Dominic will check.
- c. Mihaela Spulber offered to help Dominic as an assistant for the website.
- d. Suggestions for the website additions:
  - i. Checklist—Mihaela Spulber & Jocelyn Leger volunteered in Jan – working...
  - ii. FAQ—headed by David Markuz– working...

## 7.0 Liaison Reports:

7.1 ASHRAE 90.1: (Andrew Moore)

- a. Project committee working on 2013 edition. Goal is 50% increase over 2004. No change to minimum VRF efficiency for 2013.
- b. On July 1<sup>st</sup> IEER requirement goes up to 15% (rather than 10%) above unitary.
- c. 10CFR 431 (DOE) all the 90.1 levels were adopted, with the exception of the 0.2 heat recovery bump for water source units between 17,000 & 135,000 Btu/hr.

7.2 ASHRAE 15: (Paul Doppel)

- a. 7.3 needs re-writing—In Jan Paul Doppel volunteered to take the lead – no action yet. SSP 15 committee members agree that 7.3 needs some work, but requires a change proposal with backup logic, data, etc. Dominic K. & Mihaela S. & Dermot M. offered to help.

- b. ASHRAE 15 (Paul D.)—RTAR, as discussed under research. ASHRAE 15 requested TC 8.7 to co-sponsor. Voted and approved. 7-0-0
- 7.3 ASHRAE 62.1/62.2: (Paul Doppel)
- a. 62.1 & 2 are looking at filtration issues
    - i. (MERV ratings for whole house & perhaps room by room)
    - ii. PM 2.5 is the issue—trying to address how to address.
    - iii. Many VRF systems do not have high MERV filtration.
- 7.4 ASHRAE 250: (Ron Domitrovic) None

## 8. Old Business – None

## 9. New Business

- a. Steve Duda, Section 8 head from TAC addressed the meeting. Complemented TC on its operation. Steve's email: [sh8@ashrae.net](mailto:sh8@ashrae.net)
  - i. He presented Paul Doppel with a certificate for his service to the TC.
  - ii. ASHRAE board voted to change the bylaws to address the many folks that received free registration.
  - iii. Speaker assessment target is 3.5 (1-5 scale)
  - iv. Example data--Chicago (~25 of 250 scored below a 3.5)
  - v. Every winter meeting starting with Dallas will have a session on improving speaking skills.
- b. Status of AHRI certification program (Paul Doppel & Jon Lemmond (AHRI))
  - i. Currently 5 members, expecting at least one more this year.
  - ii. First year program through Intertek had ~91% passing.
  - iii. Next round of certification is soon to begin.
  - iv. [www.ahrinet.org](http://www.ahrinet.org) → click certification programs
- c. ASHRAE Standard 147—reduce refrigerant leaks...
  - i. Did not convene at this meeting.
  - ii. Still waiting for the revised standard to go for public review—
- d. DOE—VRF is the only system that is permitted to have a manufacturer representative present to setup/adjust the system for rating testing.
- e. Apparently, the DOE only has authority to specify EER & COP, not IEER.
- f. Dermot mentioned some discussion related to adding testing/rating points for low temperature operation—perhaps as low as 0 deg F. Some resistance from other manufacturers and testing labs.

## 11. Adjournment

- a. Next meeting: Jan 22-26, 2013 in Dallas TX
- b. Chris Bellshaw spoke to again thank Paul Doppel for both his leadership of the committee and for his leadership on the Handbook.
- c. All agreed.
- d. Motion to adjourn—2<sup>nd</sup>—passed 6-0-0-CNV.
- e. Adjourned.