



ASHRAE TC8.7 Variable Refrigerant Flow Committee



**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 DRAFT MINUTES COVER SHEET

TC 8.7 Variable Refrigerant Flow
Monday, January 25, 4:15 pm–6:30 pm, (Orlando Hilton, Floor LL, Room Orange G)
LOCATION: Orlando Florida

MEMBERS PRESENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE (Corresponding Members)	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE (Guests)
Brian Bogdan	2014	Chris Bellshaw	Julie Eagle
Dermot McMorrow	2015	John Cummings	Karl Tallakson
Arturo Thur de Koos	2014	Doug Tucker	Laura Degitz
Bach Tsan	2015	Chris Williams	Diane Jakobs
Chris Lesnar	2015	Keith Reihl	Fumio Ota
Piljae Im	2015	John Vucci	Klint Leete
Duke Hung	2015	Dustin Meredith	Kaiyu Sun
		Ron Domitrovic	Kristof Irwin
		Paul Doppel	Kyoungrock Kim
		Madhav Kashinath	Yi Qu
		Pam Duffy	Eric Chen
		Matt Bruge	Karthigeyan Kathirue
MEMBERS ABSENT	YEAR APPTD	Wei Wang	Ruben Willmarth David B. Lewis
Dave Heckler	2014	Dan Pettway	Chris Laughman
			Yaoyu Li
Ishtiaq A Chisti		EX-OFFICIO MEMBERS AND ADDITIONAL ABSENT	Kevin Gardner
		Mihaela Spulber Hongzhou Dong	Sean Faltermeier

Richie Mohan	2015	Ramez M Afify	Hitoshi Hashimoto
John Molnar	2014	Roberto R Aguilo	Alison Williams
William Artis	2015	Jerine Ahmed	Mark Alatorre
Patrick Riley	2015	Peter R Armstrong	Stan Sveen
Mike Stem	2015	John Bade	Ng Yong Kong
		Morton H Blatt	Klint Leete
		David W Bodenshatz	Manalee Nabar
		Thomas M Bourquin	Alamelu Brooks
		Oswaldo D S Bueno	
		Ishtiaq A Christi	
		Soolyeon Cho	
		Brian P Dougherty	
		Stephen W Duda	
		Wei Fang	
		Steven L Faulkner	
		David Scott Frey	
		Jun Furuta	
		Chris Haws	
		Tianzhen Hong	
		Jin Jin Huang	
		Sam C M Hui	
		Roger C Hundt	
		Yunho Hwang	
		Dean W Johnson	
		Phillip A Johnson	
		Robert A Jones	
		Paraskevi Koutsogianni	
		Wayne Kraft	
		Christopher R Laughman	
		Christopher Li	
		Dunstan Macauley	
		David Markusz	
		Norm Maxwell	
		John Miles	
		Andrew Moore	

		Sachin J Nehete Shawn M OHara W Vance Payne Kevin Brent Peck Malcolm Persaud Myron J Ramage Bob Skorupsky Paul Solbert Kirk Stifle Russell J Tivolacci Russell D Taylor Harshal R Upadhye Timothy W Young Sami Zendah Yanda Zhang Thomas M Lawrence Cameron R Labunski Joseph E Sanders Christopher K Wilkins James Dale Aswegan Michael R Vaughn	
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DISTRIBUTION

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

1. **Call to Order**

Chairman Bogdan called the meeting to order at 4:15 p.m. Members and guests introduced themselves. There were 7 members in attendance out of 13. A quorum was present.

2. **Welcome/Introductions**

47 people in attendance.

3. **Minutes Approval**

Upon motion made and duly seconded, TC 8.7 unanimously voted to approve the Summer Conference, June 2015 meeting minutes.

4. **Agenda Review/Updates**

5. **Chair's Comments**

Chairman Bogdan reported that four new MTGs have been formed. One of the MTGs is of interest to TC 8.7, *MTG.ASEC – Avoided Source Energy Consumption Due to Waste Heat Recovery and Heat Pump Technologies*, Chair: Cary Smith.

The new ASHRAE TC website format was discussed during the Chairman's breakfast. Letter ballots may be a future addition to the website. Chairman Bogdan encouraged all the members to update their ASHRAE information.

Lastly, the Chairman reminded the members that seminar proposals are due February 8, 2016.

6. **Subcommittee Reports**

6.1 Handbook Chapter

Mr. Doppel reported that the handbook chapter has been approved and submitted. There is a delay on getting the final print for review, this is expected in early February.

6.2 Membership

Mr. McMorrow updated the list of members since last meeting and has been sent to the Chairman and approved. There are 13 voting members. The roster update form will be going online, this is the last meeting using the old paper format.

6.3 Program

Mr. Bellshaw reported the various programs related to TC 8.7 presented during this ASHRAE conference:

- Seminar 21: *Demand Response Using Variable Refrigerant Flow Systems*, had a good turn out.
- Conference Paper 17: *Improvements in Building Systems*, will be held on Tuesday, January 26, 2016.

- Seminar 62: *Variable Refrigerant Flow Systems: Best Practices for System Efficiency and Longevity*, will be held on Wednesday, January 27, 2016.
- Mr. Doppel noted that Technical Paper Session 6: *Refrigerant and Refrigeration Systems*, taking place on Tuesday, January 26, 2016, may be of interest to TC 8.7.

Mr. Belshaw also reported on the new tracks for the future ASHRAE Conference meeting in St. Louis and Las Vegas.

- St. Louis Tracks
 - Advances in Refrigeration Systems and Alternative Refrigerants; Fundamentals and Applications; HVAC Systems and Equipment; Smart Building Systems/Remote Monitoring and Diagnostics; Indoor Environment: Health, Comfort, Productivity; Professional Skills Beyond Engineering; Renewable Energy Systems; and Net Zero Buildings.
- Las Vegas Tracks
 - Fundamentals and Applications; HVAC&R Systems and Equipment; Water-Energy Nexus; Commercial and Industrial IAQ; Mission Critical Design and Operation; Effects of Climate Change on HVAC&R; Energy Efficient Industrial Buildings; and Building Operation and Performance.

Suggestion for Programs for the future. Proposals for St. Louis are due February 8, 2016.

- Commissioning of VRF Systems (Mr. Belshaw volunteered to lead)
- Renewable Energy and VRF (Net Zero) (Mr. Doppel and Dr. Laughman volunteered to lead)
- Modeling and VRF (Monitor interest for now, bring back up during St. Louis meeting for possible Las Vegas seminar)

6.4 Research

Mr. Doppel reported on behalf of John Molnar.

WS 1684 – Update on Dispersion of Released Gaseous Refrigerants to Connecting Spaces via Transfer Openings. ASHRAE SSPC 15 did not approve the work statement because VRF was removed from WS 1684, therefore, they were not in favor of supporting it anymore. The work statement was officially canceled by ASHRAE. There has been other industry work on this topic (including a paper being presented by Dr. Laughman on connected spaces). These could be a jumping point to start a new project, possibly a presentation for St. Louis.

MTG.ASEC: *Avoided Recovery Source Energy Consumption Due to Waste Heat Recovery and Heat Pump Technologies*. This MTG is looking for additional members to join, specifically from TC 8.7. Ms. Duffy volunteered to attend the next meeting.

6.5 Standards

Mr. Bellshaw deferred his report to the individual liaison reports.

6.6 ASHRAE Learning Institute

Mr. McMorro reported on the seminar presented at the ASHRAE Learning Institute titled “*VRF Technologies Introductions and Applications*.” The seminar was very popular and a full house. This

should be considered for every ASHRAE meeting, with a potential to add an online version. The Professional Development Group is leading this effort. Ms. Duffy suggested presenting this material at the local ASHRAE chapter level. Mr. McMorrow agreed and believes the slides could be modified to fit within a local ASHRAE chapter meeting.

6.7 Webmaster

Mr. Thur de Koos reported that the webpage is up to date using the new format. Mr. Bellshaw suggested adding a list of ASHRAE journals related to VRF on the website.

7. Liaison Reports

7.1 Liaison to ASHRAE 90.1

Mr. Cummings reported that the main topic of discussion during the ASHRAE 90.1 meeting was Addendum BS. There is one comment out for publication and review, made by Ashley Armstrong (DOE). The comment was against the introduction of the new EER metric. The committee left the EER in the previous version and added IEER. This change was approved for a second public review. The DOE rulemaking is expected this year. Expecting Addendum BS will be adopted by November 2016.

Additional topics included addressing SI units and moving from 2 columns to 1.

7.2 Liaison to ASHRAE 189.1

Mr. Tucker reported that the efficiency tables shown in ASHRAE 90.1 are showing higher levels than ASHRAE 189.1, this needs to be reviewed.

7.3 Liaison to ASHRAE 15

Mr. Tucker reported that there was a session on the re-write of the standard. No substantive changes are being considered. Trying to reorganize the standard to make it easier to adopt by IMC, UMC and other state codes. UL 1995 will go away soon (~2020-2021) to be replaced by the IEC standard. Bill Hanson reported on this at the ASHRAE 15 meeting.

7.4 Liaison to ASHRAE 62.1

Mr. Doppel reported that there are two subcommittees; the Administration and Education subcommittees. The new Chairman proposed a new organizational structure which was approved. The new organizational structure includes; Administration, Research, Ventilation, Building Systems and Equipment. This will put manufacturers in one area to make it easier to review issues that relate to them. St. Louis will be the first time this will be implemented. There was also a speaker that discussed CO₂ that he worked on.

7.5 Liaison to TC 205

Mr. Doppel reported that the TC is focused on chillers, trying to get a draft out for public review. He is working with them on the VRF section. This is tied to work being done with the CEC.

7.6 MTG for Guidelines for Avoided Electric Generation

Liaison, John Molnar could not make the meeting. Mr. Doppel reported on behalf of John Molnar. MTG.ASEC: *Avoided Recovery Source Energy Consumption Due to Waste Heat Recovery and Heat Pump Technologies*. This MTG is looking for additional members to join, specifically from TC 8.7. Ms. Duffy volunteered to attend the next meeting.

8. Old Business

9. New Business

Chairman Bogdan reported that TC 2.6 was looking for help from the VRF section on the handbook chapter for sound ratings. Ms. Duffy volunteered to provide information. Chairman Bogdan will provide information to Ms. Duffy on who contacted him once contact information is forwarded.

Mr. Reihl indicated that TC 7.8 was looking for some guidance on equipment life for VRF. This would be information for a table in a TC handbook. Members suggested 15-20 years for air-source equipment and 20-25 years for water-source equipment.

9.1 DOE Doppel

Mr. Doppel reported that IEER for rooftop units has been released. Members should be mindful as there are some items that came out of the DOE SNO PR that will impact VRF equipment. VRF has not completed the conversion from EER to IEER, this is being worked on in AHRI Standard 1230. AHRI Standard 1230 covers systems below and above 65,000 Btu/h. Revisions to 1230 include new definitions for tested combinations.

Committee Requested Chair (Bogdan) to contact SSPC 15 Chair (Dorman) to get information on research SSPC is looking at similar to the now inactive WS1684. Information has been requested and a response was given by the SSPC 15 chair, which was forwarded to the ASHRAE 15 Liaison (Tucker) to formulate a position for the committee to consider.

10. Adjournment

There was a motion to adjourn and second. The meeting was adjourned at 5:38 p.m.