

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-  
CONDITIONING ENGINEERS, INC.  
1791 Tullie Circle, N.E./Atlanta, GA 30329  
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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-2.9 DATE January 26, 2015

TC/TG/MTG/TRG TITLE: Ultraviolet Air and Surface Treatment

DATE OF MEETING January 26, 2015 LOCATION Palmer House Hilton, Logan Room, 3<sup>rd</sup> Floor

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Dean Saputa	7-1-14	Dave Witham	7-1-11	16
Sam Guzman	7-1-14	Charles Dunn	7-1-12	
Benoit Despatis-Paquette	7-1-14			
Matt Middlebrooks	7-1-11			
Richard Vincent	7-1-12			
Robert Coleman	7-1-13			
Jason Degraw	7-1-13			
Scott Sherwood	7-1-13			

**DISTRIBUTION**

<i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head:	<b><u>Mr J Thomas Sobieski</u></b>
TAC Chair:	<b><u>Dr Eric W Adams, PhD</u></b>
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters:	Mr Michael R Vaughn Mr Cyrus H Nasser Mrs Annette Dwyer Mr Christopher J Ahne Dr Darin W Nutter, PE Mr Harvey M Sachs, PhD Mr Chris S Fudge
Manager Of Standards Manager Of Research & Technical Services	Stephanie Reiniche Mike Vaughn

2015 ASHRAE Winter Conference  
Chicago, IL

Monday, Jan 26, 2015 at 10:00-NOON  
Room: Palmer House Hilton, Logan Room, 3<sup>rd</sup> Floor

**These DRAFT minutes have not been approved and are not the official record until approved by the Technical Committee at the 2015 Summer Conference in Atlanta, GA**

TC2.9 Scope – TC2.9 is concerned with all aspects of equipment and systems that utilize ultraviolet radiation to destroy or de-activate chemical and/or biological air and surface contaminants in HVAC systems and indoor spaces, including, but not limited to, effectiveness, safety, maintenance, and economics.

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Call to Order – 10:04 AM by Dean Saputa

Self-introduction of all present.

Roll-Call of Voting Members

TC-2.9- UV Air and Surface Treatment- Voting Members as of 2015 ASHRAE Chicago Meeting (1-26-15)							
First Name	Middle	Last	Email Address	8/20/2014	Date Appointed	Date Rolling Off	Attendance (Chicago)
				ASHRAE Roster			1/26/2015
Dean		Saputa	<a href="mailto:dean.saputa@uvresources.com">dean.saputa@uvresources.com</a>	V	7/1/2014	6/30/2016	X
Sam		Guzman	<a href="mailto:advanced.energy.systems@gmail.com">advanced.energy.systems@gmail.com</a>	V	7/1/2014	6/30/2018	X
Dave		Witham	<a href="mailto:davew@uvdi.com">davew@uvdi.com</a>	VNQ	7/1/2011	6/30/2015	
Benoit		Despatis-Paquette	<a href="mailto:bdespatis@sanuvox.com">bdespatis@sanuvox.com</a>	V	7/1/2014	6/30/2015	X
Matt		Middlebrooks	<a href="mailto:mmiddlebrooks@filtrationgroup.com">mmiddlebrooks@filtrationgroup.com</a>	V	7/1/2011	6/30/2015	X
Richard		Vincent	<a href="mailto:richard.vincent@MountSinai.org">richard.vincent@MountSinai.org</a>	VNQ	7/1/2012	6/30/2016	X
Robert		Coleman	<a href="mailto:rcoleman@trane.com">rcoleman@trane.com</a>	V	7/1/2013	6/30/2017	X
Jason		Degraw	<a href="mailto:degrow@psu.edu">degrow@psu.edu</a>	V	7/1/2013	6/30/2017	X
Scott		Sherwood	<a href="mailto:ecocareny@aol.com">ecocareny@aol.com</a>	V	7/1/2013	6/30/2017	X
Charles		Dunn	<a href="mailto:chuckdunn@lumalier.com">chuckdunn@lumalier.com</a>	V	7/1/2012	6/30/2015	
V=	Voting Member						
VN=	Voting-Not in Attendance						
VNQ=	Voting-Non Quorum						

<b>Voting Present</b>	<b>8</b>	<b><u>Quorum met</u></b>
<b>Voting-Not-Present</b>	<b>1</b>	<b>Charles Dunn</b>
<b>Non-Quorum No Present</b>	<b>1</b>	<b>Dave Witham</b>
<b>Total Voting</b>	<b>10</b>	

**Seattle meeting minutes:** As no quorum of voting members was present at this meeting, no official business was conducted; however minutes were taken and distributed for information and discussion.

Correction: Jaak Geboers was in attendance.

Correction: Jaak Geboers name misspelled but corrected.

Correction: Brian Rodgers name misspelled but corrected.

Vote for approval of minutes. eight approved, none opposed.

**Project Update: Bill Bahnfleth.**

Discussion of UPR (Unsolicited Project Request) in general, and URP-1738 specifically. Federal cutbacks jeopardize ongoing projects. ASHRAE approved step-up funding for time-sensitive projects. Joe Firrantello of Penn State University discussed \$125,000 DOE Hub contract to interject energy efficiency and IAQ into existing buildings.

Project: Field Measurements and Modeling of UVC Cooling Coil Irradiation For HVAC Energy Use Reduction.

Coil treatment study Tampa and Penn State using donated UV equipment.

Baseline equal no UVC.

Developing energy modeling and the impact of energy efficiency.

Pressure drop across coil.

Joseph Firrantello stated objectives of study:

1. Energy
2. IAQ
3. Maintenance

- Microbiological surface sampling
- 12 to 18-months until publication

Team was unable to share presentation during the TC meeting, but Mr Bahnfleth and Mr. Firrantello authorized TC Chair to forward copies to the TC members.

**Bob Coleman Website report.**

Website must be updated at least 30 days before meetings.

**Subcommittee reports:**

Richard Vincent research. RTAR approved. Subcommittee 185.1 RTAR, C, 185.2 RTAR, Suggested:

1. Ozone UV removal; Dave Witham and Bob Coleman.
2. UV reflectivity of coils; from Jason to Steve Martin
3. Photo reactivity of materials (get minutes from Richard for incorporation into our minutes)

**Standards Committee;** Jaak Geboers

Dean reported 185.1 submitted for approval. 185.2 published and in bookstore. ARTAR will be submitted for round robin testing.

**GPC guideline project committee;**

Richard Vincent reported that Committee kickoff was this morning. End goal of GPC is creation of a document for integrating use of upper UVGI. High attendance at first meeting and volunteer assignments made.

**Mobile room device;**

Katja Auer recommended tabling GPC until after publication of Duke (DICON) study to benefit from published research.

**Programs:**

Richard Vincent, Bill Bahnfleth, and Ashish Mathur proposed new program topics: and opened discussion:

Proposed Summer Programs:

1. How to “do” UVC, including installation and commissioning guidelines.
2. Upper air. Dr. Nardell suggested as presenter.
3. 185.1 RTI results – Introduction to the standards and application of 185.1

Proposed Winter Programs:

1. PCO seminar or forum (is PCO—good or bad?) Introduction / summary of research and case studies (on-going PCO study at Concordia University)
2. 5.10 RTAR, conditional approval UVC for grease removal in kitchen hoods (1614WS)

**Handbook subcommittee, Steve Martin**

Updates to Chapter 17 of Systems and Equipment handbook due in June. Committee members to submit proposed edits, update tables, and send draft to all committee members for review and comment prior to June Meeting.

**Membership**

Emergency roster change in Seattle, but no quorum present. Chuck Dunn rolls off 6-30-15. Current committee membership is manufacturer-heavy. Suggested the committee recruit replacement members from academia/research. Benoit Despatis-Paquette volunteered to be membership chairman.

**ISO TC14.2 Matt Middlebrooks**

Safety level draft approved. Working group. Must send out for comments.

**UL 1995 Brian Rodgers**

Proposed changes to UL 1995 regarding UV lamps. Brian authorized the TC to send a copy of the proposed changes to TC committee members for review. Changes to be published in UL 1995 by the end of the first quarter. Accepted and approved.

Proposed ABQK 3-year effective date. March, 2018.

**IEC 60335-2.5.40**

Project to convert the UL requirements to IEC international standard.

- Door switches
- Safety switches
- Leakage tests

1. Factory installed
2. Field installed
3. Duct installed

Latest draft will be distributed to membership for information only.

**New action –**

1. Benoit discussed the identification of odor caused by UVC. Odor generated is above odor / smell threshold, but below health threshold. Benoit will distribute study results to 2.9 membership.
2. Revise/Review FAQ—Mark Jackson, Dean Saputa
3. Position document on filtration and air cleaning submitted and accepted to be reviewed. What are health effects of air cleaning devised?
4. ASHRAE position statement to be published against ozone.
5. Accessible web page—airborne infection. Dean Saputa to distribute February Popular Science article.

**Committee entered Executive Session.**

Non-voting members excused from meeting

Meeting adjourned at 11:43 AM.

**2015 ASHRAE Winter Conference – Chicago, Illinois**

**TC 2.9 Handbook Subcommittee Meeting**

**Sunday, January 25, 2015**

**10:00-12:00**

**Clark Room #10, 7<sup>th</sup> Floor, Palmer House Hilton**

**TC 2.9 Handbook Subcommittee Report: Steve Martin, Handbook Subcommittee Chair**

TC 2.9 has two handbook chapters that we are responsible for maintaining.

On July 7, 2017, the TC voted to approve updates to Chapter 60 that will be published in the forthcoming 2015 Applications Handbook. The Applications chapter was updated to flow better and remove some of the repetitiveness in the 2011 published version. Comments that we received from two members of the ASHRAE College of Fellows were also addressed in the updated chapter.

Our next formal handbook responsibility is to update the current version of Chapter 17, “Ultraviolet Lamp Systems,” published in the 2012 Systems and Equipment Handbook. The deadline for submission of our revised version is July 30, 2015, so the changes will need to be approved at the 2015 Annual Conference in Atlanta. The Systems & Equipment chapter is in much better shape than the Applications chapter was, so no significant changes are expected. Previously, the only change discussed was to update Table 2, “Summary of UV-C Resistance Ratings of Tested Materials” to make it more clear and informative. Regardless, Steve Martin sent Dean Saputa the official ASHRAE Word file and asked that he send the chapter out to everyone to review. Any proposed

changes that the TC membership would like to see made should be submitted to Steve Martin ([SMartin1@cdc.gov](mailto:SMartin1@cdc.gov)) and Dean Saputa ([Dean.Saputa@UVResources.com](mailto:Dean.Saputa@UVResources.com)) by March 1, 2015. Steve will work to incorporate all suggested updates into a new version to be sent out to the TC prior to the Atlanta meeting.

**Meeting Notes  
2015 Chicago, IL**

**Monday, January 26, 2015, Room: Sanburg 3**

**GPC-37- Guidelines for the Application of Upper-Air (Upper Room) Ultraviolet Germicidal (UV-C) Devices to Control the Transmission of Airborne Pathogens.**

Meeting was called to order at 8:10 am

Introductions were made by all attendees and a sign in sheet was passed around.

Members of the committee are:

Richard Vincent-Chair (present)  
Dean Saputa-Voting (present), Secretary  
Jan Pottinger-Voting (NOT-Present)  
David Skelton-Voting (Present)  
Jonathan Flannery-Voting (Present)  
Forrest Fencil-Non-Voting (NOT-Present)

Quorum Met

Richard asked that all that wish to be on the committee should go onto the ASHRAE website to follow the instructions to get on the committee.

Richard passed out a suggested outline for the guideline for discussion

People the guideline should address:

- Should be engineers, users, designers...

Guidance should be how and where to apply upper safely

- Thomas Lesser suggested that in the background section on mixing and infection. And will work on 11.6.3
- Steve Martin and Johnathan Flannery volunteered to take on the definitions section of the Guideline
- Sam Guzman and Johnathan Flannery to take on maintenance.
- David Skelton and John Putnam volunteered to tackle commissioning
- Dean Saputa with Thomas Lesser and John Putnam will take on the background section--all of section 5
- Bill Palmer to look at design methodology 11.4
- Josephine Lau to take on section 7-Radiometry

Should the guideline make a recommendation on who should install and maintain these devices? Possible the infectious control personnel and the maintenance staff...certain level of knowledge to apply these devices

It was suggested to limit this guideline to louvered and open air irradiation of an occupied space.

We want to make this guideline as an “International Approach” to the application of Upper Air

We should define a process for the user to go thru for the proper installation of these devices; ie: school nurse, principal, hvac tech. or hospital; infectious control, nursing, environmental control...etc.

Richard Vincent adjourned the meeting at 9:30 am

**Meeting Notes**  
**2015 Chicago, IL**  
**Sunday, January 25, 2015, Room: Clark 10**  
**10:00 am to 11:13 am**  
**TC 2.9 Research Subcommittee**

- 1. Introductions:** Mr. Vincent, began the meeting by thanking Steve Martin for chairing the research subcommittee for the Seattle meeting. Introductions were made around the room and a sign-in sheet was circulated.
- 2. RAC Liaison—**Mr. Harvey Sachs, TC 2.9’s research liaison gave perspective of RAC deliberations. He gave instructions on the vote on the selected bidder being held in confidence until a contract was signed.
- 3. Minutes:** meeting notes from the Seattle meeting were incorporated into the Main committee meeting notes.
- 4. Research Activity:**
  - a. Penn States Project 1738 with Joseph Firrantello and William Bahnfleth was approved for funding by ASHRAE. A presentation will be made at TC 2.9 main committee by Joe and Bill.
  - b. 1724 on Photodegradation of HVAC System materials at Low UVC Light Levels was put out to bid. Two bids were received and rated by the Project Evaluation Subcommittee. A unanimous vote selected a bidder to be voted upon by the main TC 2.9 committee. After TC 2.9 votes, the result will be forward to the RAC for its consideration and possible contract.
  - c. New RTARS
    - i. RTAR 1669 was handed-off to Steve Martin and Dave Witham for follow-up
    - ii. RTAR on Ozone removal by UV—Bob Coleman and Dave Witham
    - iii. RTAR Round Robin Standard 185.1—Steve Martin
    - iv. RTAR Round Robin Standard 185.2—Dean Saputa
- 5. Other items:** Benoit described white paper on UV and odor production. The committee members encouraged his consideration in publishing his findings so that they could be referenced.
- 6. Adjournment:** 11:13 am.
- 7. Attendees:**
  - a. Richard L. Vincent, Chair Icahn School of Medicine at Mount Sinai,  
[Richard.Vincent@mountsinai.org](mailto:Richard.Vincent@mountsinai.org)

- b. Sam Guzman, American Ultraviolet Co, [SGuzman@AUVCo.com](mailto:SGuzman@AUVCo.com)
- c. Katja Auer, Xanitos/Consulting, [KatjaDorisAuer@yahoo.com](mailto:KatjaDorisAuer@yahoo.com)
- d. Jaak Geboers, Philips Lighting [Jaak.Geboers@philips.com](mailto:Jaak.Geboers@philips.com)
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- g. Stephen Martin, CDC/NIOSH, [smartin1@cdc.gov](mailto:smartin1@cdc.gov)
- h. Joseph Firrantello, Penn State, [jxf282@psu.edu](mailto:jxf282@psu.edu)
- i. Bob Coleman, Trane, [rcoleman@trane.com](mailto:rcoleman@trane.com)
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- o. Jason DeGraw, NREL, [Jason.degraw@NREL.gov](mailto:Jason.degraw@NREL.gov)