



Shaping Tomorrow's
Built Environment Today

MINUTES

RESEARCH ADMINISTRATION COMMITTEE

**OMNI HOTEL
ATLANTA, GA**

DECEMBER 17TH, 2018 & JANUARY 12TH & 16TH, 2019

Note: These draft minutes have not been approved and are not the official, approved record until approved by the Research Administration Committee (RAC).

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DECEMBER 17TH, 2018 & JANUARY 12TH & 16TH, 2019

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**PRINCIPAL MOTIONS
RESEARCH ADMINISTRATION COMMITTEE
DECEMBER 17TH, 2018 & JANUARY 12TH & 16TH, 2019**

NO.	PAGE	MOTION
1	2	Draft minutes of the RAC fall 18 meeting be approved as written.
2	2	RAC referred the request from Van Baxter to use IEA travel grant funds originally put in the budget for Annexes 41 and 42, for new annexes 53 and 54 be referred to Special Projects for consideration.
3	3	2017-18 GIA recipient Alireza Haghighatmamaghani be awarded the second payment, less the actual cost of the standard international travel cost.
4	3	<u>1822-RTAR, Supplemental Normalization Parameters for Alternate/Enhanced Expression of Energy Performance – TC 7.6 (Building Energy Performance), is <u>accept with comments.</u></u>
5	3	<u>1870-RTAR, Investigating Occupant Energy Behavior and Building-Human Interaction in Office Buildings – MTG.OBB (Occupant Behavior in Buildings), is <u>rejected.</u></u>
6	4	<u>1871-RTAR, Hygrothermal Modeling of Below Ambient Pipe Insulation Systems in Both Buildings and Refrigeration – TC 1.8 (Mechanical Systems Insulation), is <u>accept with comments.</u></u>
7	4	<u>1872-RTAR, Updating Site Energy Targets for ASHRAE Standard 100-2018 - Energy Efficiency in Existing Buildings – TC 7.6 (Building Energy Performance), is <u>accept with comments.</u></u>
8	4	<u>1873-RTAR, Upper-Air Ultraviolet Germicidal Irradiation (UVGI) for Tall Spaces – TC 2.9 (Ultraviolet Air and Surface Treatment), is <u>accept with comments.</u></u>
9	4	<u>1874-RTAR, Optimizing Air Curtains and the Effect on the Infiltration Load of Refrigerated Display Cases with Glass Doors – TC 10.7 (Commercial Food and Beverage Refrigeration Equipment)), is <u>accept with comments.</u></u>
10	4	<u>1876-RTAR, Round Robin Testing to Validate ANSI/ASHRAE Standard 185.2-2014 – TC 2.9 (Ultraviolet Air and Surface Treatment), is <u>accept with comments.</u></u>
11	4	<u>1703-WS, Performance of Vapor Retarder Systems Used on Mechanical Insulation; sponsored by TC 1.8 (Mechanical Insulation), be <u>returned</u></u>
12	4	<u>1797-WS, Assessment of the A/B toxicity classification used in Standard 34; sponsored by TC 3.1 (Refrigerants and Secondary Coolants), is <u>conditionally accepted.</u></u>
13	5	<u>1817-WS, Long-term Temperature Change of Ground Heat Exchangers; sponsored by TC 6.8 (Geothermal Heat Pump and Energy Recovery), be <u>returned.</u></u>
14	5	<u>1838-WS, Emerging Gas-Phase Electronic Filtration Technologies and ASHRAE 145.2 Test Standard n; sponsored by TC 2.3 (Gaseous Air Contaminants and Gas Contaminant Removal Equipment), is <u>conditionally accepted.</u></u>
15	5	<u>1875-WS, Develop cost and performance indices to evaluate effectiveness of virtual airflow meters in HVAC application; sponsored by TC 7.5 (Smart Building Systems, be <u>returned.</u></u>
16	5	RAC approved a motion to award Omar Sarfraz the 2019-20 Homer Addams award.

17	5	RAC approved a motion that the following IRG pre-proposals be invited to submit full IRG proposals; #003, #006, #012, and #015.
18	6	1848-TRP, <i>Assessing the Impacts and Value of ASHRAE's Standards and Technology</i> , be awarded to the Lawrence Technical University, for a period of 12 months at a total cost to ASHRAE of \$84,775.
19	6	A funded extension for active research project 1734-RP, <i>Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing to be used in ASHRAE GPC 35P for Determining the Energy Consumption Caused by Air Filters</i> , be awarded to Purdue University, for a period of 12 months at a total cost to ASHRAE of \$15,346.83.
20	6	RAS rejected a funded extension request for active research project 1614-RP, <i>Developing a Test Method to Determine the Effectiveness of UVC Systems on Commercial Cooking Effluent</i> .
21	6	Mohammad Heidarinejad be awarded the 2019-2020 <i>New Investigator Award</i> .
22	7	<u>1784-TRP</u> , <i>Repeatability and Reproducibility Assessment of ASHRAE Standard 52.2 as currently Amended</i> , be awarded to Owen Air Filtration Consulting, LLC, for a period of 18 months at a total cost to ASHRAE of \$150,000.
23	7	<u>1847-TRP</u> , <i>Updating Climatic Design Information for the 2021 ASHRAE Handbook, Standard 169, and the Handbook of Smoke Control Engineering</i> , be awarded to the Klimaat Consulting & Innovation Inc., for a period of 24 months at a total cost to ASHRAE of \$144,000.

New Action Items
Research Administration Committee (RAC)
Winter Pre-Meeting 2019
DECEMBER 17TH, 2018 & JANUARY 12TH & 16TH, 2019

Action #	Responsibility	Summary of Action	Status
1	Staff	Compile a report listing the last fifty projects awarded for bid.	On-going
2	Shonder	Draft a letter for non-winner GIA nominees in reference to New Member's Council Referral.	Complete
3	Staff	Post the PTAR forms to basecamp.	Complete
4	Staff	Send Purdue University a letter of complaint for how RP-1734 was handled by university staff.	On-going

Fall Action Items

Action #	Responsibility	Summary of Action	Status
1	MORTS	Letter ballot RAC on motion to increase reserve fund transfer above 4% for SY 19-20 research budget.	Complete
2	MORTS	Add work statement 1838 to Winter meeting agenda for review.	Complete
3	MORTS	Carry-over contractor recommendation for TRP-1848 to Winter meeting agenda.	Complete
4	MORTS	Carry-over funded extension requests for TRP-1614 and RP-1734 to Winter meeting agenda.	Complete

Carry-Over Action Items
Annual Meeting 2018

Action #	Responsibility	Summary of Action	Status
1	Pouchak	Add plain English abstract to the work statement form.	Complete
2	MORTS	Send Doodle poll to RAC members to determine the best time for a fall meeting.	Complete
3	Pouchak, Shonder, Yashar	Develop and improve the cost estimating procedures.	On-going

**RECURRING ACTION ITEMS
(EACH MEETING)**

<u>Responsibility</u>	<u>Summary of Action</u>
Chair	Report to Technology Council on RAC's MBO Status.
Research Liaisons	Remind all TC chairs and research subcommittee chairs in section that a draft of all Work Statement and RTARs, and all later versions should be sent to their Research Liaison for review before information is passed on to the Manager of Research.
RPS (Primary) RAS (Secondary)	Review RTARs
RAS (Primary) RPS (Secondary)	Review Work Statements
RAS (Primary) RPS (Secondary)	Review TRPs and URPs
RPS (Primary) upon (Secondary)	Review and revise the Society's Research Implementation Plan based accepted RTARs.
Subcommittee Chairs	Report Status of assigned MBOs.
Staff	Distribute copies of Technology Council's Action Items and Motions affecting RAC.
BOD ExO	Report to the RAC Chair BOD's Actions and Motions affecting RAC.
Staff	Forward URPs to RAS Chair to help identify a champion for the URP on RAC based on members background and experience. The RAC URP Champion will either help select a cognizant TC to review the URP or return the URP with a recommendation that it not be reviewed further as a possible ASHRAE research project.

**RECURRING ACTION ITEMS
(FALL MEETING)**

<u>Responsibility</u>	<u>Summary of Action</u>
RAS	Initial Plan for Research Breakfast Workshop for Winter Meeting
RLs	Review "Service to ASHRAE Research Award" nominations submitted by TC chairs and select the best nomination for RAC consideration.
MORTS	Prepare semi-annual report to RAC by December 15.

RECURRING ACTION ITEMS
(WINTER MEETING)

<u>Responsibility</u>	<u>Summary of Action</u>
RPS	Review New Investigator Award Nominations
RPS	Review Homer Addams Award Nominations
RPS	Review Innovative Research Grant (IRG) Pre-Proposals
MORTS	Prepare semi-annual report to RAC by May 15.

RECURRING ACTION ITEMS
(SPRING MEETING)

<u>Responsibility</u>	<u>Summary of Action</u>
RPS	Plan workshop for new RAC members at the Annual meeting.
RPS	Review Grant-In-Aid Applications

RECURRING ACTION ITEMS
(ANNUAL MEETING)

<u>Responsibility</u>	<u>Summary of Action</u>
Chair	Invite new RAC members to meeting and any training sessions at meeting.
Incoming Chair	Finalize MBOs and roster assignments. Set date for fall meeting.
RAS	Review Invited Innovative Research Grant (IRG) Full-Proposals

LIST OF ATTACHMENTS

ATTACHMENT 1: 1848-TRP Analysis Sheet
ATTACHMENT 2: MORTS Report
ATTACHMENT 3: 1784-TRP Analysis Sheet
ATTACHMENT 4: 1847-TRP Analysis Sheet



Shaping Tomorrow's
Built Environment Today

MINUTES

RESEARCH ADMINISTRATION COMMITTEE REPORT TO TECHNOLOGY COUNCIL DECEMBER 17TH, 2018 & JANUARY 12TH & 16TH, 2019

MEMBERS PRESENT:

John Shonder, *Chair*
David Yashar, *Vice-chair (12/07 only)*
Christopher Wilkins, *Chair RAS*
Curtis Eichelberger, *Chair RPS*
Shinsuke Kato, *RL Section 1.0*
Pawel Wargocki, *RL Section 2.0*
Stephen Kujak, *RL Section 3.0*
Michael Pouchak, *RL Section 4.0*
Dennis Loveday, *RL Section 5.0*
Omar Abdelaziz, *RL Section 6.0*
William Murphy, *RL Section 7.0*
Christopher Seeton, *RL Section 8.0*
Paolo Tronville, *RL Section 9.0*
Xudong Wang, *Consultant AHRTI*
Hywel Davies, *Consultant CIBSE*
Douglas Fick, *BOD Ex-Officio*
Michael Schwedler, *Coordinating Officer*

GUESTS:

Krishnan Gowri, *Incoming RL*
Jose Correa
Art Giesler
Van Baxter
Mark Tilles
Michael Ecko
Chee Sheng

ASHRAE STAFF:

Michael Vaughn, *MORTS*
Steve Hammerling, *AMORTS*
Cindy Michaels, *SPEC. PUB.*

MEMBER ABSENT:

David Yashar, *Vice-chair*
Ezzat Khalifa, *RL Section 10.0*
Ian Cull, *Consultant IAQA*

A. CALL TO ORDER

Chair Shonder called the meeting of the committee to order at 8:00 AM.

B. ASHRAE CODE OF ETHICS

<https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>

C. ADDITIONS AND/OR CHANGES TO THE AGENDA

None

D. APPROVAL OF MINUTES

It was moved and seconded that,

- (1) The draft minutes of the RAC fall 2018 meetings be approved as written.

MOTION #1 PASSED: 6-0-2, CNV

E. CHAIR'S REPORT

a. Disposition of Motions from Last Meeting or Letter Ballots –

1. Letter ballot results since fall meeting:

Letter Ballot Motion: RAC recommends to Technology Council Operations Subcommittee that a percentage larger (6% to 7%) than the minimum 4% reserve fund transfer be granted for the Society year 19-20 research budget.

Background: Current draft budget for projects, grants and awards for next year, FY 19-20, is \$2,483,100. RAC has already committed approximately half that amount for FY 19-20. If all 16 projects listed in Attachment #3 are under contract in September 2019, we will only have approximately \$70,000 available for the fall 2019 bid solitation for new projects that are awarded and under contract in March 2020. RAC approved two new work statements at their fall meeting and more will be considered at our winter and spring meetings this year.

RAC Vote: 11-0-1-2 (14) CNV – Letter Ballot 11/2/18 to 11/19/18

New & On-going Action Items Assigned by Tech. Council - None

b) New Information Items:

1. Request from Van Baxter to use IEA travel grant funds for new Annexes 53 & 54 in addition to Annexes 41 & 42. – discussed in Atlanta, requested direction from Technology Council Special Projects.
2. Contract Agreement finalized with Univ. Central Florida (UCF) on RP-1844 (Estimating Internal Moisture Generation Rates in New, Occupied Homes) after impasse was broken.
3. Status on Motion for Increased Reserve Fund Transfer (6% instead of 4%) for SY 19-20.

c) MBO Status Report – Review with action items

It was moved and seconded that,

- (2) RAC referred the request from Van Baxter to use IEA travel grant funds originally put in the budget for Annexes 41 and 42, for new annexes 53 and 54 be referred to Special Projects for consideration.

MOTION # PASSED: 10-0-1 CNV

F. BOD EX-OFFICIO & COORDINATING OFFICER REPORTS

BOD- Ex-Officio, Douglas Fick gave ExO presentation to RAC. Highlights of the report were the February 16th deadline for standing committee recommendations. Ad HOC is looking at three membership models for 2020-21 Implementation. He asked for input on the 2019-2024 Strategic Plan. Also, asked to let Ex-Officio know what RAC members wish to do once they roll off.

G. DISCUSSION ITEMS

- a) 17-18 GIA Recipient Alireza Haghghatmamaghani VISA problem & need for GIA 2nd Payment exception.
- b) New Member's Council Referral regarding the GIA review & notification process.

- c) Spring PMS Training Session Date & Feedback on Fall session - **MBO 1.1**
- d) Update on proposed new procedures & forms for evaluating Technology Transfer related ASHRAE research projects – Yashar Lead - **MBO 1.2**
- e) Update on Research Project Database development efforts - **MBO 1.3**
- f) Update on efforts to develop guidance document for TCs to better estimate cost of RPs - **MBO 1.4**
- g) Disposition forms and follow-up?

It was moved and seconded that,

- (3) 2017-18 GIA recipient Alireza Haghighatmamaghani be awarded the second payment, less the actual cost of the standard international travel cost.

MOTION #2 PASSED: 8-0-1, CNV

Action #1 <STAFF>: Compile a report listing the last fifty projects awarded for bid.

Action #2 <SHONDER>: Draft a letter to Member’s Council in reference to the non-winning GIA applicants and Region 1 referral.

Action #3 <STAFF>: Post the PTAR forms to basecamp.

H. ACTION ITEM TRACKING AND INITIAL REVIEW OF FALL ACTIONS & MBOs

**Carry-Over Action Items
Research Administration Committee (RAC)
Annual Meetings 2018**

Action #	Responsibility	Summary of Action	Status
1	Pouchak	Add plain English abstract to the work statement form.	On-going
3	Pouchak, Shonder	Develop and improve the cost estimating procedures..	On-going

I. PROPOSED PROCEDURAL CHANGES

None

J. RTAR REVIEW

RTAR reviewed seven RTARs

It is moved and seconded that,

- (4) 1822-RTAR, Supplemental Normalization Parameters for Alternate/Enhanced Expression of Energy Performance – TC 7.6 (Building Energy Performance), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (5) 1870-RTAR, Investigating Occupant Energy Behavior and Building-Human Interaction in Office Buildings – MTG.OBB (Occupant Behavior in Buildings), is rejected.

MOTION # PASSED RPS: 5-0-0 CNV

It is moved and seconded that,

- (6) 1871-RTAR, Hygrothermal Modeling of Below Ambient Pipe Insulation Systems in Both Buildings and Refrigeration – TC 1.8 (Mechanical Systems Insulation), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (7) 1872-RTAR, Updating Site Energy Targets for ASHRAE Standard 100-2018 - Energy Efficiency in Existing Buildings – TC 7.6 (Building Energy Performance), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (8) 1873-RTAR, Upper-Air Ultraviolet Germicidal Irradiation (UVGI) for Tall Spaces – TC 2.9 (Ultraviolet Air and Surface Treatment), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (9) 1874-RTAR, Optimizing Air Curtains and the Effect on the Infiltration Load of Refrigerated Display Cases with Glass Doors – TC 10.7 (Commercial Food and Beverage Refrigeration Equipment)), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (10) 1876-RTAR, Round Robin Testing to Validate ANSI/ASHRAE Standard 185.2-2014 – TC 2.9 (Ultraviolet Air and Surface Treatment), is accept with comments.

MOTION # PASSED: 11-0-0, CNV

K. WORK STATEMENT REVIEW

RAC reviewed five work statements that were submitted by the TCs for review.

It is moved and seconded that,

- (11) 1703-WS, Performance of Vapor Retarder Systems Used on Mechanical Insulation; sponsored by TC 1.8 (Mechanical Insulation), be returned.

MOTION # PASSED RAS: 3-0-0, CNV

It is moved and seconded that,

- (12) 1797-WS, *Assessment of the A/B toxicity classification used in Standard 34*; sponsored by TC 3.1 (Refrigerants and Secondary Coolants), is conditionally accepted.

MOTION # PASSED: 9-0-2 CNV

It is moved and seconded that,

- (13) 1817-WS, *Long-term Temperature Change of Ground Heat Exchangers*; sponsored by TC 6.8 (Geothermal Heat Pump and Energy Recovery), be returned.

MOTION # PASSED RAS: 3-2-0, CV

It is moved and seconded that,

- (14) 1838-WS, *Emerging Gas-Phase Electronic Filtration Technologies and ASHRAE 145.2 Test Standard n*; sponsored by TC 2.3 (Gaseous Air Contaminants and Gas Contaminant Removal Equipment), is conditionally accepted.

MOTION # PASSED: 11-0-0, CNV

It is moved and seconded that,

- (15) 1875-WS, *Develop cost and performance indices to evaluate effectiveness of virtual airflow meters in HVAC application*; sponsored by TC 7.5 (Smart Building Systems), be returned.

MOTION # PASSED RAS: 3-2-0, CV

L. HOMER ADAMS

It is moved and seconded that,

- (16) RAC approved a motion to award Omar Sarfraz the 2019-20 Homer Addams award.

MOTION # PASSED: 10-0-1, CNV

M. INNOVATIVE RESEARCH GRANT

It is moved and seconded that,

- (17) RAC approved a motion that the following IRG pre-proposals be invited to submit full IRG proposals; #003, #006, #012, and #015.

MOTION #10 PASSED: 10-0-1, CNV

N. FUNDED EXTENSION REQUESTS AND CARRY-OVER TRPS

- a) **1848-TRP**, *Design Guide for Low –to-Mid-Rise Multifamily Residential Buildings*; RAC Consideration of MTG. IAST (Impact of ASHRAE Standards & Technology) Committee - Contractor Recommendation
- b) **RP-1734**, *Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing to be used in ASHRAE GPC*

35P for Determining the Energy Consumption Caused by Air Filters – TC 2.4
(Particulate Air Contaminants and Particulate Contaminant Removal
Equipment) – Co-sponsor: SSPC 52.1 Funded Extension Request

- c) **RP-1614**, *Developing a Test Method to Determine the Effectiveness of UVC Systems on Commercial Cooking Effluent* – Funded Extension Request – TC 5.10 Kitchen Ventilation)

It is moved and seconded that,

- (18) **1848-TRP**, Design Guide for Low-to-Mid-Rise Multifamily Residential Buildings, be awarded to the Lawrence Technical University, for a period of 12 months at a total cost to ASHRAE of \$84,775. (**Attachment #1**)

MOTION PASSED: 10-1¹-1-2 CNV

It is moved and seconded that,

- (19) A funded extension for active research project **1734-RP**, *Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing to be used in ASHRAE GPC 35P for Determining the Energy Consumption Caused by Air Filters*, be awarded to Purdue University, for a period of 12 months at a total cost to ASHRAE of \$15,346.83.

MOTION PASSED: 10-0-1 CNV

Action #4 <STAFF>: Send Purdue University a letter of complaint for how RP-1734 was handled by university staff.

It is moved and seconded that,

- (20) RAS rejected a funded extension request for active research project **1614-RP**, *Developing a Test Method to Determine the Effectiveness of UVC Systems on Commercial Cooking Effluent*.

MOTION PASSED RAS: 5-0-0 CNV

O. NEW INVESTIGATOR AWARD

Eight nominations were received for the 2019-20120 New Investigator Award.

It is moved and seconded that,

- (21) Mohammad Heidarinejad be awarded the 2019-2020 New Investigator Award.

MOTION # PASSED: 11-0-0, CNV

P. RESEARCH SUBCOMMITTEE CHAIR'S BREAKFAST

1. Service to ASHRAE Research Award recipient this year – Jensen Zhang – TCs 2.3, 4.3, 4.10.

¹ Omar Abdelaziz - I felt that this project would be better handled by consulting offices with input from managing consultants. Also the proposal from the University of Washington involved a PI with a more suitable background and also have better student involvement (as evident from the summary sheet), however, the PES didn't account for that in their overall assessment.

- Submission date for Service to ASHRAE Research Award Sep. 1st
2. Importance of obtaining full TC votes on approvals of submitted RTARs and WSs for both sponsoring and co-sponsoring TCs
 3. WS based on conditionally approved RTAR must acknowledge how conditions were cleared.
 4. Be sure to include Milestones in WSs submitted to RAC
 5. Additional Announcements:
 - a. Add slides on publications PPT (3 slides)
 - b. Encourage cofunding of projects
 - c. PMS continuing education, available online. Spring training.
- b. RL review of all RTARs/WS is imperative.

Q. CONSULTANTS REPORTS

- a) AHRI – Xudong Wang – Co-funding commitment for 1728 & 1731 withdrawn.
- b) CIBSE – Hywel Davies – Not in meeting at this point. Request written report for minutes

R. MORTS Report

Semi-Annual Report, highlights from the report were discussed and the full report is included as (**Attachment #2**).

S. TRPs to Potentially Bid Spring 2019 (6 TRPs)

- 1644-TRP, TC 5.6, (Control of Fire and Smoke)
- 1683-TRP-R, TC 1.3, (Heat Transfer and Fluid Flow)
- 1740-TRP-R, TC 3.3, (Refrigerant Contaminant Control)
- 1816-TRP, TC 9.6, (Healthcare Facilities)
- 1833-TRP, MTG.ACR, (Air Change Rates)
- 1836-TRP, TC 7.6, (Building Energy Performance)

T. UNFINISHED OR OUT-OF-SEQUENCE BUSINESS

- Van Baxter on IEA. Asked for unfunded extension for IEA travel. \$50k allocated previously and \$3k spent. Wish to use \$47 k for 2 new annexes. Van was asked to ask annexes to estimate time and # of trips necessary.
- Omar suggested RAC revisit 200\$k limit for projects to be reviewed by BOD and perhaps raise this number given costs of research are rising.

U. TENTATIVE RESEARCH PROJECTS

It is moved and seconded that,

- (22) **1784-TRP**, *Repeatability and Reproducibility Assessment of ASHRAE Standard 52.2 as currently Amended*, be awarded to Owen Air Filtration Consulting, LLC, for a period of 18 months at a total cost to ASHRAE of \$150,000. (**Attachment #3**)

MOTION # PASSED: 10-0-1 CNV, CNV

It is moved and seconded that,

- (23) **1847-TRP**, *Updating Climatic Design Information for the 2021 ASHRAE Handbook, Standard 188, and the Handbook of Smoke Control Engineering*, be awarded to the Klimaat Consulting & Innovation Inc., for a period of 24 months at a total cost to ASHRAE of \$144,000. (**Attachment #4**)

MOTION # PASSED: 11-0-0 CNV

NOTE: RAC did not receive a contractor recommendation for the following TRPs.

- **1780-TRP**, “Test method to evaluate cross-contamination of gaseous contaminant within total energy recovery wheels”, sponsored by, TC 9.10, Laboratory Ventilation
- **1789-TRP**, “Optical and thermal performance of hollow glass block units”, sponsored by, TC 4.5, Fenestration
- **1810-TRP**, Development of Reference Building Information Model (BIM) Test Cases for Improving Usage of Software Interoperability Schemas”, sponsored by, TC 1.5, Computer Applications
- **1830-TRP**, Experimental Characterization of Aircraft Bleed Air Particulate Contamination”, sponsored by, TC 9.3, Transportation Air-Conditioning
- **1837-TRP**, “The Effects of Ventilation in Sleeping Environments”, sponsored by, TC 2.1, Physiology and Human Environment

V. UNSOLICITED RESEARCH PROPOSALS

Unsolicited Research Proposals

1853-URP, “Building on an Existing Residential Ventilation Project: Brushless Permanent Magnet (BPM) Motor Change-Outs, Pollutant Emissions Characterizations, and Testing Multi-zone Ventilation System effectiveness;
Status: TC 4.3 recommended not to fund.

W. RESEARCH LIAISON SECTION REPORTS

RLs were asked to send reports to staff

X. UNFINISHED BUSINESS

Need for a follow-up conference call – TRPs to bid spring 2019.

Y. REVIEW NEW ACTION ITEMS

ADJOURNED

RAC adjourned at 9:45 AM.