



Shaping Tomorrow's Built Environment Today

MINUTES

Environmental Health Committee (EHC)

June 26, 2020

Virtual Annual Meeting

MEMBERS PRESENT:

Wade Conlan, *Chair*
Wei Sun, *Vice-Chair*
Peter Alspach
Bill Bahnfleth
Charlene Bayer
Hoy Bohanon
Nicholas Clements
Kishor Khankari
Rick Hermans, *BOD Ex-O*
Luke Leung
Elliott Horner, *Consultant*
Andy Persily
Dennis Knight, *Coord. Officer*
Max Sherman
Erica Stewart
Wayne Thomann

MEMBERS NOT PRESENT:

Karel Kabele
Stephanie Taylor

ASHRAE STAFF:

Steve Hammerling, *MOTS*
Stephanie Reiniche, *Director of Technology*

GUESTS:

Nick Agopian
Brendon Burley, *Incoming Member*
Dave Delaquila
John Earman
John Elson
Steve Emmerich
Paul Francisco
Henry Greist
Lew Harriman
Dan Koenigshofer
Josephine Lau
Claressa Lucas, *Incoming Member*
Dusan Licina
Frederick Marks
Tim McGinn, *Incoming Coord. Officer*
LanChi Nguyen-Weekes
Kathleen Owen
Jovan Pantelic
Dustin Poppendieck
Chandra Sekhar
Varunesh Sharma
Paul Supan
Iain Walker
Pawel Wargocki
Don Weekes
Aaron Wilson
Crag Wray
Marwa Zaatari

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MOTIONS

No.	Motion	STATUS
1	the minutes from the 2020 ASHRAE Winter Meeting in Orlando be approved.	PASSED
2	EHC recommends to Operations Subcommittee (OPS) that they recommend to Tech Council to approve the EHC MOP with changes as shown	PASSED
3	EHC recommends to OPS that they to Tech Council to recommend to the BOD, that the ASHRAE ROB be changed as shown:	PASSED
4	EHC approve changes to the EHC Reference Manual as shown in	PASSED
5	EHC recommends that DRSC recommends to Tech Council to recommend to the BOD that the Position Document on <i>Indoor Air Quality</i> be published as revised.	PASSED
6	EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on <i>Infectious Aerosols</i> be initiated.	PASSED
7	EHC recommends that DRSC recommends to Tech Council to recommend to the BOD that the Position Document on Environmental Tobacco Smoke be published as revised.	PASSED
8	EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on Filtration and Air Cleaning be initiated.	PASSED
9	EHC recommends that DRSC recommend that Tech Council reaffirm the Unvented Combustion Devices and Indoor Air Quality Position Document (PD).	PASSED
10	EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on Limiting Indoor Mold and Dampness in Buildings be initiated.	PASSED
11	EHC recommends co-sponsors TC 2.1's RTAR 1907, <i>Development of the First Global Indoor Air Quality Database</i> .	PASSED

LIST OF ATTACHMENTS

No.	Attachment
A	MBOs 2019-2020
B	EHC MOP revisions
C	EHC Reference Manual revisions
D	draft MBOs 2020-2021
E	BOD ExCom presentation
F	ETF report to BOD
G	IAQ PD revision
H	IAQ PD TPS
I	Infectious Aerosols TPS
J	ETS PD
K	ETS TPS
L	Filtration and Air Cleaning TPS
M	Limiting Mold and Dampness in Buildings TPS

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ACR	Air Change Rate
AI	Action Item
AiCARR	Italian Association of Air Conditioning, Ventilation and Refrigeration
AIHA	American Industrial Hygiene Association
AIVC	Air Infiltration and Ventilation Centre
ASA	Acoustical Society of America
ASHRAE	American Society of Heating, Refrigerating and Air-conditioning Engineers
A&WMA	Air and Waste Management Association
BOD	Board of Directors
CEC	Conferences & Expositions Committee
CFD	Computational Fluid Dynamics
CO	Coordinating Officer
CNV	Chair Not Voting
DOE	Department of Energy
DRSC	Document Review Subcommittee
EHC	Environmental Health Committee
EHS	Environmental Health Safety
EIB	Emerging Issue Brief
ENDS	Electronic Nicotine Delivery Systems
ETF	Epidemic Task Force
ETS	Environmental Tobacco Smoke
ExO	Ex-Officio
GAC	Government Affairs Committee
GSA	General Services Administration
HQ	Headquarters

IAQ	Indoor Air Quality
IAQA	Indoor Air Quality Association
IEQ	Indoor Environmental Quality
IEQ-GA	Indoor Environmental Quality Global Alliance
ISHRAE	Indian Society of Heating, Refrigerating and Air Conditioning Engineers
MBO	Management by Objectives
MOP	Manual of Procedures
MOTS	Manager of Technical Services
MTG	Multi-disciplinary Task Group
OPS	Operations Subcommittee
PD	Position Document
PMS	Project Monitoring Subcommittee
PPIB	Public Policy Issue Brief
RAC	Research Administration Committee
REHVA	Representatives of European Heating and Ventilation Associations
ROB	Rules of the Board
RTAR	Research Topic Acceptance Request
SSPC	Standing Standard Project Committee
SY	Society Year
TC	Technical Committee
TG	Task Group
TPS	Title Purpose and Scope
VIC	Ventilation Infection Controls
WS	Work Statement

ACTION ITEMS FROM 2020 VIRTUAL ANNUAL MEETING

No.	Responsibility	Action Item	Status
1	Staff	Staff to post updated ROB/MOP/Reference Manual to EHC webpage and Basecamp	
2	Staff	Staff agreed to post reaffirmed and revised PDs (pending approval) to ASHRAE website.	
3	Alspach/Burley	Send latest draft of Indoor Environmental Impact of Climate Change to EHC for review	
4	EHC	Review and comment on WS-1798, <i>Impact of Combustion Emissions from Gas-Fired Unvented Combustion Devices on Indoor Air Quality</i>	
5	Khankari	Khankari to send draft strategic research plan to EHC when available	

ACTION ITEMS FROM 2020 WINTER MEETING (ORLANDO)

No.	Responsibility	Action Item	Status
OR-1	EHC	Consider a working group of EHC to implement IEQ initiative from ASHRAE Strategic plan	Ongoing
OR-2	Alspach/Burley	Review and comment on EIB on Indoor Environmental Impact of Climate Change	Ongoing
OR-3	ExCom	Develop specific ROB, MOP and Reference Manual changes for subcommittee restructuring for consideration in the spring	Complete
OR-4	Conlan	Submit new subcommittee assignments when restructure documents are done	Complete

ACTION ITEMS FROM 2019 ANNUAL MEETING (KANSAS CITY)

No.	Responsibility	Action Item	Status
KC-8	Taylor / Burley	Taylor and Burley were asked to explore a possible ASHRAE RTAR or WS related to the GSA sleep study	Delete
KC-9	Clements	Make changes to <i>Survey of Biowall Water Systems for Waterborne Microbial</i> based on replies	Delete

ACTION ITEMS FROM 2019 WINTER MEETING

No.	Responsibility	Action Item	Status
AT-7	Clements, Stewart	Revise RTAR on Impact of Meeting Room Environmental Conditions on Performance, Collaboration, and Comfort.	Delete

1. CALL TO ORDER & INTRODUCTIONS

Chair Conlan called the meeting to order at approximately 11:00 PM. Members and guests introduced themselves. Quorum was confirmed.

2. ASHRAE CODE OF ETHICS COMMITMENT

'In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests.' (See full Code of Ethics: www.ashrae.org/about-ashrae/ashrae-code-of-ethics.)

3. REVIEW OF AGENDA

No changes to the agenda sent prior to the meeting were requested.

4. MINUTES

It was moved (KK) and seconded (ES) that,

(1) the minutes from the 2020 ASHRAE Winter Meeting in Orlando be approved.

BACKGROUND: Draft minutes were sent to committee in March 9th email

MOTION 1 PASSED:11-0-1*, CNV

* CB abstained as she did not attend meeting.

5. CHAIR'S REPORT (Conlan)

A. Letter ballot summary

1. Letter Ballot 2020-5, Motion to approve chapter F10, *Environmental Health*. [*Chapter was approved and sent to Handbook Editor for inclusion in 2021 Fundamentals Volume*]
2. Letter Ballot EHC 2020-04, Motion to approve an Emerging Issue Brief (EIB) titled *Pandemic COVID-19 and Airborne Transmission* [*EIB was approved and posted to EHC page of website.*]

B. Motions from Past Meetings Requiring Higher Body Approval

1. Meeting of April 10
 - a) To recommend approval of ASHRAE Infectious Aerosols PD [*This motion was approved by DRSC, Tech Council and BOD and published to ASHRAE website*]
2. Annual Meeting
 - a) To recommend reaffirmation of the *Airborne Infectious Diseases* PD for a period of 6 months [*This motion was approved by DRSC and Tech Council*]
 - b) To recommend appointing members William Bahnfleth, Howard Kipen, Josephine Lau, Corrine Mandin, Chandra Sekhar, Pawel Wargocki, & Lan Chi Nguyen Weekes to the *Indoor Carbon Dioxide* PD committee. [*This motion was approved by DRSC and Tech Council*]
 - c) To recommend Technology Council recommend to the BOD that SSPC 62.2 addendum a to 62.2-2019 on unvented combustion appliances be approved for publication. [*This motion was postponed by Tech Council*]
 - d) To recommend Technology Council recommends to Publication & Education Council that they make the *Residential IAQ Guide* available for free download to the public. [*This motion was referred to P&E Council for their consideration. [PubEd replied that they'd make available for free preview on ASHRAE's COVID-19 resources page.]*]

C. 2019-2020 Management by Objectives (MBOs)

1. The final status of EHC MBO's for SY 2019/2020 is shown in **Attachment A**.

6. VICE-CHAIR'S REPORT (Sun)

A. ROB/MOP/Reference Manual

Changes to the EHC ROB, MOP and Reference Manual were developed and distributed prior to the EHC meeting. The aim is to better align EHC with their intended purpose as a standing committee of ASHRAE tasked with identifying, informing, and responding to major environmental health trends. EHC changes to their Reference Manual include a restructuring of their subcommittees and tasks.

It is moved (WS) and seconded (MS) that,

- (2) EHC recommends to Operations Subcommittee (OPS) that they recommend to Tech Council to approve the EHC MOP with changes as shown in **Attachment B**.

BACKGROUND: Changes include editorial changes, clarification of various duties and responsibilities, and clarifications on subcommittees.

MOTION 2 PASSED: 10-0-2* CNV

* MS and AP abstained

It is moved (KK) and seconded (WS) that,

- (3) EHC recommends to OPS that they to Tech Council to recommend to the BOD, that the ASHRAE ROB be changed as shown:

2.406.01 MEMBERSHIP

2.406.01.1 Composition

The members of this committee are as follows

- A. Maximum of fifteen (15) voting members, including a chair and vice chair.;
- B. Voting members shall include at least:
 1. a past member of the Standards Committee.
 2. One past member of the Research Administration Committee (Research Liaison for 2.0,4.0, or 5.0)
 - 3. one past chair of a technical committee involved in environmental health or indoor air quality issues.
 - 4 one member from outside the U.S. and Canada
 5. two Health Professional (such as an industrial hygienist, physician, an epidemiologist, or a public health official.)
 6. a past Society officer who has recently served in that capacity.
(85-06-27-58/86-06-22-22/98-01- 16-16/07-03-02-6B/18-06-27-20)
- C. Non-voting members include a Board ex-officio member, and a coordinating officer, ~~and immediate past chair~~. (15-07-02-18)

BACKGROUND: Change removes requirement that the immediate past chair of EHC be included on the committee as a non-voting member.

MOTION 3 PASSED: 11-0-1* CNV

*AP abstained

It is moved (WS) and seconded (ES) that,

(4) EHC approve changes to the EHC Reference Manual as shown in **Attachment C**.

BACKGROUND: Change are made to incorporate and add detail to subcommittee structure and activity changes.

MOTION 4 PASSED: 10-0-2* CNV

*AP/MS abstained

Staff agreed to post updated documents to [EHC webpage](#) and [Basecamp](#) (AI #1).

B. Budget

No changes were requested to EHC budget.

C. Donald Bahnfleth Environmental Health Award

Paul Francisco was announced as the winner of 2020 Donald Bahnfleth Environmental Health Award. Note the deadline for nominations for the 2021 are due Nov. 1.

D. 2020-2021 EHC MBO's

Proposed EHC MBO's for SY 2020/21 are shown in **Attachment D**.

7. BOARD OF DIRECTORS (BOD) EX-OFFICIO (Ex-O) & COORDINATING OFFICER (CO) REPORT

A. BOD EX-Officio – Hermans

Time was short for the BOD Ex-O report, so RH referred all to the BOD Ex-O presentation (**Attachment E**) and asked all to send him any questions.

B. Coordinating Officer

Coordinating Officer Dennis Knight addressed EHC and thanked all on behalf for their work.

8. ASHRAE IAQ 2020 CONFERENCE

The IAQ 2020 Conference, *IEQ Performance Approaches, Transitioning from IAQ to IEQ*, will be moved to a date in 2021. The conference will take place in Athens, Greece as a face to face meeting. Bill Bahnfleth and Max Sherman are co-chairing the event which will be co-organized by ASHRAE, AIVC and the IEQ-GA. Details on the conference can be found at www.ashrae.org/iaq2020.

9. IEQ-GA

ASHRAE continues to participate in the IEQ-GA with Bill Bahnfleth as the ASHRAE representative. The IEQ-GA is now finalized as a legal entity and operates with seven full member organizations (ACGIH, AICARR, AIHA, AIVC, ASHRAE, ISHRAE, REHVA) with ASA joining soon. There are two other affiliate associations (A&WMA, IAQA). IEQ-GA (www.ieq-ga.net) has collected and posted COVID-19 related resources from the various member organizations.

10. ASHRAE Epidemic Task Force (Bahnfleth)

Knight submitted a copy of the ETF's formal report to the BOD (**Attachment F**).

Hermans noted TAC just approved a Multidisciplinary Task Group (MTG) on Ventilation for Infection

Controls (VIC). The focus will be on research needs and publications related to the epidemic.

11. SUBCOMMITTEE REPORTS

A. Handbook Subcommittee (Leung)

1.0 2021 Fundamentals chapter F10

EHC's update to Chapter F10, *Environmental Health* was completed earlier in the year. The revised chapter will be in the 2021 Fundamentals Volume of the ASHRAE Handbook. EHC members were thanked for their efforts. Luke Leung was key to the completion of the update.

2.0 Next revision due in 2024 for 2025 publication

EHC had discussed working with TCs for future updates where possible. It was noted the Education Subcommittee would lead the Handbook update going forward. New content could pull from work of the EHC Policy Subcommittee.

B. Policy Subcommittee (Khankari)

1.0 Position Documents (PD)

A. Indoor Air Quality (IAQ)

A revision to the IAQ PD has been under development and is ready for EHC to consider approving.

It was moved (ES) and seconded (MS) that,

- (5) EHC recommends that DRSC recommends to Tech Council to recommend to the BOD that the Position Document on *Indoor Air Quality* be published as revised.

BACKGROUND: The PD is included as **Attachment G**. The BOD approved title, purpose and scope (TPS) is included as **Attachment H**. A version of this revised PD was initially sent to DRSC/Tech Council/BOD on May 28th and again with revisions to address review comments on June 23rd. The attached draft matches what was sent with one change highlighted in the Abstract. The current PD expires 6/28/2020.

MOTION 5 PASSED: 12-0-0 CNV

B. Infectious Aerosols

This PD was just approved in April, but EHC wishes to update with more time and with the experiences gained from the current epidemic response. A number of comments on the PD have been collected and can be given to PD chair. Walt Vernon was suggested as the chair and was willing to lead if asked. The chair recommends their PD committee for Tech Council approval, but there were a number of volunteers on the call (Larry Schoen, Wayne Thomann, Jovan Pantelic volunteered. Paul Supan. Bill Bahnfleth (ETF chair). Chandra. Don Weekes, Wei Sun). Stephanie Taylor was suggested as well.

It was moved (CB) and seconded (WS) that,

- (6) EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on *Infectious Aerosols* be initiated.

BACKGROUND: No changes to the current TPS, shown in **Attachment I**, are requested at this time. EHC will recommend Walt Vernon serve as chair.

MOTION 6 PASSED: 12-0-0 CNV

C. Environmental Tobacco Smoke (ETS)

A revision to the ETS PD is ready for EHC to consider approving the PD committee voted unanimously to approve the revision.

It was moved (CB) and seconded (WS) that,

- (7) EHC recommends that DRSC recommends to Tech Council to recommend to the BOD that the Position Document on *Environmental Tobacco Smoke* be published as revised.

BACKGROUND: The PD is included as **Attachment J**. The BOD approved TPS is included as **Attachment K**. A version of this revised PD was sent to DRSC/Tech Council/BOD on May 31st and remains unchanged since then. The current PD expires 6/26/2021.

MOTION 7 PASSED: 12-0-0 CNV

It was suggested that if the revised Environmental Tobacco Smoke PD reported on above is approved, GAC will wish to review the newly approved PPIB on Environmental Tobacco Smoke to assure consistency.

D. Indoor Carbon Dioxide

Persily noted that the development of the Indoor Carbon Dioxide PD is underway. The PD Committee is meeting next July 8. An outline is developed at this time and a draft is anticipated by the end of the summer.

E. Filtration and Air Cleaning

The current PD expires 1/23/2021 so EHC should make a recommendation to revise, reaffirm or withdraw. EHC felt a revision may be appropriate to update the state of the art on various technology. Pawel Wargocki was suggested as chair. The aim would be to assure representation from all TCs that would have an interest. Brendan Burley volunteered to participate.

It was moved (MS) and seconded (WS) that,

- (8) EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on *Filtration and Air Cleaning* be initiated.

BACKGROUND: No changes to the current title, purpose and scope (TPS), shown in **Attachment L**, are requested at this time. EHC will recommend Pawel Wargocki serve as chair with appropriate representation on the PD committee from all cognizant ASHRAE committees. This PD is set to expire 1/23/2021.

MOTION 8 PASSED: 12-0-0 CNV

F. Unvented Combustion Devices and Indoor Air Quality

The current PD expires 1/23/2021 so EHC is expected make a recommendation to revise, reaffirm or withdraw.

It was moved (MS) and seconded (HB) that,

- (9) EHC recommends that DRSC recommend that Tech Council reaffirm the *Unvented Combustion Devices and Indoor Air Quality* Position Document (PD).

BACKGROUND: The technical content of this PD does not need to change. It is not in the current ASHRAE PD format but EHC can reformat to get into current format PD if desired.

MOTION 9 PASSED: 12-0-0 CNV

G. Limiting Mold and Dampness in Buildings

The current PD expires 6/27/2021 so EHC should make a recommendation to revise, reaffirm or withdraw. EHC reached out to the chair of the previous PD, Lew Harriman, who suggested a revision. Co-cognizant committee TC 1.12 voiced their support for a revision with Lew Harriman as Chair.

It was moved (KK) and seconded (WT) that,

- (10) EHC recommends that DRSC recommend to Tech Council that they recommend to the BOD that a revision to the Position Document on *Limiting Indoor Mold and Dampness in Buildings* be initiated.

BACKGROUND: No changes to the current title, purpose and scope (TPS), shown in **Attachment M**, are requested at this time.

MOTION 10 PASSED: 12-0-0 CNV

Staff agreed to post reaffirmed and revised PDs (pending approval) to ASHRAE website (**AI #2**).

2.0 Emerging issue briefs (EIB)

A. Emerging issue briefs

- o New EIBs

EHC approved a new in April titled *Pandemic COVID-19 and Airborne Transmission*. This is posted on EHC page of website.

- o Current emerging issue briefs

There are now nine EIBs on the EHC page of the website:

- EHC Emerging Issue - Pandemic COVID-19 and Airborne Transmission
- EHC Emerging Issue - Electronic Nicotine Delivery Systems (ENDS) in Indoor Environments (July 2018)
- EHC Emerging Issue – Potential Microbial Contaminants in Biowall Water and Soil Systems (April 2018)
- EHC Emerging Issue – Indoor Passive Panel Technologies for Air Cleaning in Buildings (July 2016)
- EHC Emerging Issue – Nano Environmental Health and Safety (nanoEHS) (January 2016)
- EHC Emerging Issue - Ozone and Indoor Chemistry (January 2011)
- EHC Emerging Issue – Biological agents and airborne transmission (January 2010)
- EHC Emerging Issue – Ventilation, Humidity Control & Health Effects in Buildings using Split System AC Equipment (January 2010)

- EHC Emerging Issue - Vector Borne Disease, Climate Change and the Challenges to ASHRAE (June 2010)
- Retire or revise any current EIBs?
EHC should continue to review and monitor EIBs for relevancy, to make sure they are still 'emerging', or if they should be withdrawn, developed into a PD, publication, research project, etc._
- Other/New reports
 - Indoor Environmental Impact of Climate Change
Alsapach and Burley would send to EHC for review and comment (**AI #3**).
 - 3D printers (Horner/Bayer)
No updates were reported on this topic but would aim for a draft for the Chicago Meeting. WC noted TC 9.10, Jim Coogan, and UL may have interest as well.
 - Wildfire and smoke (Horner)
Persily noted EHC recommended a Guideline 44 on this topic. This Guideline Project Committee is up and running and may have interest in participating in this EIB as well if pursued.
 - Other ideas?
An idea for design of emergency vehicle cabin ventilation systems was discussed prior to the meeting. If EHC members wish to develop, it can be pursued.

C. Education/Program Subcommittee (Bohanon)

Bohanon summarized program ideas from subcommittee discussion.

1. EHC Sponsored Programs

- There were two EHC co-sponsored seminars in the 2020 Virtual Annual Meeting program.
 - Seminar 17 - Multifamily Buildings: IAQ Issues and Responses
 - Seminar 25 - SARS, MERS, Ebola, COVID-19: How to Prepare for the Next Epidemic

Seminar 17 (Intermediate)

Multifamily Buildings: IAQ Issues and Responses
 Sponsor: Environmental Health Committee
 Chair: *Hay Bohanon, P.E., Life Member, Hay Bohanon Engineering, PLLC, Clemmons, NC*
 Multifamily buildings are an indoor air quality challenge for several reasons. Individual behaviors cannot be controlled as in an office, school, or other commercial/institutional settings. The construction practices are historically different compounding the issues of air transfer between different dwelling units. This session examines the sources of IAQ issues and provides standardized and better practice solutions.

1. How Requirements in Codes, Standards, and Programs Are Evolving to Improve IAQ in Multifamily
Gayathri Vijayakumar, REMP, Seven Wines Associates, Inc., Washington, DC

2. IAQ in Social Housing Apartment Buildings: Sources and Solutions
Jeffrey Siegel, Ph.D., Fellow ASHRAE, University of Toronto, Toronto, ON, Canada

Seminar 25 (Intermediate)

SARS, MERS, Ebola, COVID-19: How to Prepare for the Next Epidemic
 Sponsor: 2.3 Ultraviolet Air and Surface Treatment, 9.6 Healthcare Facilities, TC 2.10 Resilience & Security & Environmental Health Committee
 Chair: *Scott Silverwood, Member, East-Care Corporation, Bronx, NY*
 The recent COVID-19 outbreak has again pushed the REAL concern regarding infectious diseases into the forefront of the public's mind. Media, both news and old, are rife with frightening stories that are causing nerves to be cancelled months in advance. Facilities that have not been designed with resilience in mind are potentially part of the problem. Design professionals need guidelines and strategies to prepare facilities for a major infectious disease event, how to operate through the event, and then to sustain operations afterwards ensuring the safety of its occupants.

1. SARS and COVID-19: Responses to the Outbreaks and How They Worked
Stephanie Taylor, M.D., Member, Harvard Medical School, Infectious Disease Consultant, Boston, MA

2. Engineering Controls for Infectious Diseases
William F. Ruckelshaus, Ph.D., P.E., Fellow ASHRAE, Pennsylvania State University, State College, PA

3. Assessment and Planning for Epidemics: What Makes a Facility Resilient to Outbreaks?
Traci Hanequist, P.E., HFDP, Fellow ASHRAE, Collins Engineers, Spokane, WA

- Winter Meeting 2021 in Chicago (seminars proposals due Aug. 3)
Seminar proposals are due August 3rd. SSPC 62.1 and MTG. ACR noted they have programs for possible EHC co-sponsorship
- Residential IAQ Design Guide (possible revisions)
Sherman noted the DOE is willing to pay for revision to the residential guide to include pandemic/risk management information. An ASHRAE Special Project was formed to expand the guide in a quick timeframe. DOE is now reviewing scope of work.

EHC passed a motion in Orlando to make this publication freely available. Tech Council had referred the motion to Publications Council. The PubEd response was as follows:

The guide has now sold 133 copies since publication in April 2018 for revenue of \$10,102. In the last 12 months, it has sold 41 copies for \$3,741 revenue. Note that the guide was recently

made available for free access in read-only format on the COVID-19 resources page of the ASHRAE website. PubEd staff has recommended and the council's consensus is that the guide be made available for free download in the same manner as the commercial IAQ guide, with registration information required from users seeking to download the publication, with an option for users to buy a print edition at a price that at a minimum covers production and administration costs. PubEd staff has been assigned an action item to implement this change.

- TC Program Subcommittee Training
CEC will hold a TC program training (Tue, Jul 7, 2020 1-2 PM (EDT) - <https://global.gotomeeting.com/join/728668701>) if EHC program members wish to attend.

2. ASHRAE Journal IEQ Applications Column

Persily would send a written update after the meeting. There is currently an opening in the September issue (draft due July 8) and is seeking volunteers with names/titles/dates.

The following ideas were suggested on the call:

- Wei Sun pressure control
Wade Conlan - ETF's Building Readiness Team on re-occupancy of current ASHRAE HQ for July 8 deadline article.
- Wade Conlan – ETF's Resource Inventory Team on how to use guidance/resources
- Kishor Khankari had an idea and would reach out to Persily

D. Research Subcommittee (Sun)

1. Advanced Research Topic discussion

There was no discussion on a research topic list. The restructured subcommittees can reexamine this activity when formed.

2. Active Research Projects

RP-1579, *Testing and Evaluation of Ozone Filters for Improving IAQ*, is ongoing. EHC is a co-sponsor and Hoy Bohanon is on the project monitoring subcommittee (PMS).

3. RTARs

- RTARs reviewed
 - RTAR-1858 of "*Evaluation of HVAC ventilation effectiveness in reducing semi-volatile organic compounds (SVOCs) in indoor spaces*", proposed by TC 2.3, has been reviewed by EHC members
 - RTAR-1907, *Development of the First Global Indoor Air Quality Database*, was drafted by TC 2.1 and they are seeking EHC co-sponsorship.

It was moved (WT) and seconded (NC) that,

(11) EHC recommends co-sponsors TC 2.1's RTAR 1907, *Development of the First Global Indoor Air Quality Database*. .

BACKGROUND: EHC had reviewed this RTAR and provided comments. RAC will consider approval at their next meeting.

MOTION 11 PASSED: 12-0-0 CNV

- Newly drafted

- *Impact of Meeting Room Environmental Conditions on Performance, Collaboration, and Comfort*
- *Survey of Biowall Water Systems for Waterborne Microbial Contaminants*

Clements reported no updates on these RTARs and suggested removing from list temporarily, focusing on other issues.

NC no updates. Suggested removing from list temporarily, focus on other issues. They could be sent to relevant TCs if identified.

- *Improvement of Micro-Climates*

This RTAR has not developed. It was suggested TC 2.1 may be good home for this RTAR if they have an interest.

- New/Other RTAR ideas from EHC members

- *GSA sleep study*
- *Impact of plants and pets in workspace*

No updates were reported on these efforts.

- RAC RTAR Review

EHC was sent two RTARs for review ahead of the Annual Meeting. Comment were sent to RAC for consideration:

- 1907 – Development of the First Global IAQ Database
- 1908 - A simplified CFD modeling method to assess thermal environment and air quality in buildings with ceiling fans

4. Work Statement review

EHC was asked to review WS-1798, *Impact of Combustion Emissions from Gas-Fired Unvented Combustion Devices on Indoor Air Quality*. EHC had approved the RTAR earlier and SSPC 62.2 is seeking EHC comments on the WS (**AI #4**).

5. Other

Khankari noted he is a member of the Research Advisory Panel (RAP) developing an update to the ASHRAE Strategic Research plan. . The RAP has identified 7-8 strategic areas of research and is currently writing a brief summary of each area. Khankari would send draft plan to EHC when available (**AI #5**).

12. STANDARDS ACTIVITIES

A. Standard 62.1

Thomann reported no significant developments from SSPC 62.1 at this time.

B. Standard 188

Lucas noted that the Guideline 12, *Managing the Risk of Legionellosis Associated with Building Water Systems*, is now approved and published. Guideline 12 provides information and guidance on the control of legionellosis associated with building water systems and provides guidance useful in the implementation of ANSI/ASHRAE Standard 188, *Legionellosis: Risk Management for Building Water Systems*.

C. Standard 55

Alspach noted there were no major addenda underway at the moment.

D. Standard 62.2

Sherman reported that an ad hoc was formed to forge a path forward on the unvented combustion devices addendum. A number of new addenda have been developed and the SSPC is voting on public review.

E. Standard 189.1

Persily noted the current focus is on getting the 2020 version approved and published.

F. Guideline 10

Clements noted a number of addenda are being considered at this time

G. Standard 170

Hermans noted there were not significant updates to Standard 170.

H. Guideline 42P committee

Don Weekes noted work continues and they aim to finish a draft for public review in September 2020.

I. MTG on Health and Wellness in the Built Environment

Weekes noted the MTG has established four Task Groups:

- TG1 - task is collecting definitions of health and wellness from different organizations
- TG2 - role is to determine the impact of ASHRAE's vision, positions, publications and work on the topic of health and wellness.
- TG3- lay out how the work of this MTG can be communicated to fulfill the objectives of this MTG.
- TG4 - evaluate how organizations, particularly those involved in the high-performance building rating systems define and measure health and wellness in the built environment,

The MTG may eventually develop a position document on the topic.

J. MTG,ACR Air Change Rate

Khankari summarized that the MTG is looking at ACR considering the COVID epidemic and potential research.

K. MTG.VIC Ventilation for Infection Control

Hermans noted this MTG was just recently approved and the committee is being formed.

13. STRATEGIC DISCUSSION

A. Strategic Planning (Conlan)

Conlan noted the strategic planning topic for today's meeting was the reorganization of EHC as discussed earlier with the MOP and Reference Manual changes. To help EHC meet its stated goals for operation, there would be three new subcommittees (Policy, Education, & Coordination & Outreach) with a focus on the tasks and activities listed in the MOP and Reference Manual.

14. NEW BUSINESS

A. Next Meeting

EHC will have a Fall Web Meeting at a date and time to be determined. Sun noted he planned on holding a monthly ExCom meeting and suggested that Subcommittees convene a meeting before EHC's fall meeting.

ASHRAE is planning on a face to face Winter Meeting in Chicago, IL. EHC will meeting Monday January 25th, 2021.

15. HANDOVER TO NEW CHAIR –Sun (Chair), Leung (Vice-Chair)

A. Recognize Outgoing Members

Wade Conlan, Elliott Horner, Erica Stewart, Hoy Bohanon and Max Sherman were recognized and thanked for their participation on EHC.

B. Recognize Incoming Members

Brendan Burley, Jon Cohen, Claressa Lucas and Junjing Yang were welcomed as incoming members of EHC.

C. Subcommittee Assignments

Sun would poll members after the meeting for subcommittee assignments.

16. ADJOURNMENT

The Environmental Health Committee meeting was adjourned at approximately 2:00 PM.

Environmental Health Committee 2019-2020
Wade Conlan, Chair - Wei Sun, Vice Chair
6/23/2020

MBO #	Title	Assignment	Status	Comment	Estimated Date / Completion Date	2019 Strategic Plan Alignment Goal/Objective.(Initiative)
Policy						
1	Review currently published EIB and determine if they need to be retired, reaffirmed, or have a PD created	Policy	In Progress		1-Jun-20	1.b.(1,2)
Research						
2	Draft a report to Tech council summarizing significance events and relevant trends relating to environmental health and the built environment relevant to environmental health (RoB 2.406.004)	EHC	Completed as it is now with the MTG.HWBE		1-Sep-19	1.b.(1,2)
3	Re-name the Research Subcommittee to something more broad that fits the TPS of EHC	Research	New EHC structure includes task of "Research RTAR Review and New RP Development with other groups" under Coordination & Outreach subcommittee.	We should be thinking of what needs to be researched and then pass along to other committees within ASHRAE to move it through RAC.	5-Feb-20	3.b.(3,4)
Program						
4	Document the interaction plan with IEQ-GA for future IAQ meetings (relevant to RoB 2.406.003.1)	Program sub chair	Ongoing. IAQ 2020 planning is underway. IEQGA is planning on meeting at IAQ 2020 in Athens Greece in September 2020. IAQ 2020 moved to 2021.		5-Feb-20	1.b.(1,2) 2.b.(1,2,4)
Admin						
5	Develop a draft plan to establish liaison with a medical organization, an architectural organization that relates to environmental health	EHC	MTG for Environmental Health has taken	Steve to Provide list Created by the MTG (Wade - are we referring to MTG.HWBE?)	1-Sep-19	2.b.(1,2,4)
6A	Recommend a slate of committees within ASHRAE for which there should be an official liaison <u>TO</u> EHC	EHC	Ongoing. EHC liaisons to various standard committees reported on activities at each EHC meeting. Current committees include: 62.1, 188, 55, 189.1, G10, 170, G42P, MTG.HWRF, MTG.ACR		5-Feb-20	3.b.(3,4)
6B	Recommend a slate of committees within ASHRAE for which there should be an official liaison <u>FROM</u> EHC	EHC	which committees to list? Same as 6A? What about TCs?		5-Feb-20	3.b.(3,4)
7	Reduce in-person sub-committee meeting time for Orlando and re-evaluate for Austin	EHC	New reduced subcommittee structure implemented in ORL and for Virtual Meeting	Done	Fall 2019	3.b.(3,4)
8	EHC Outreach and Awareness - have a plan in place to follow through		Get in front of RAC and TAC - at their breakfast for promoting EHC support - and us bringing ideas to them. EHC presented at recent TC breakfast. EIB - pathway to get new and concerned items to be published in short order and on ASHRAE website New EHC subcommittee on Outreach for this specific purpose		30-Jun-20	3.b.(3,4)
Handbook						
9	Complete update to Chapter 10	Handbook Sub Chair	Chapter update complete. Thinking about plans for 2025 volume. Considering involving relevant TCs or keep within EHC. Tbd		1-Jun-20	1.a.(1,2,3) 1.b.(1,2)

Chair: Wade Conlan
Vice-Chair: Wei Sun
Consultant: Elliott Horner

Subcommittees

Research committee: Sun (chair)
Policy committee: Khankari (chair)
Handbook committee: Leung (chair)
Education/Program committee: Bohanon (Chair)



Shaping Tomorrow's
Built Environment Today

MANUAL OF PROCEDURES

FOR

**ENVIRONMENTAL HEALTH
COMMITTEE**

REVISED: ~~01-23-12~~ 05-03-20

**MANUAL OF PROCEDURES
FOR
ENVIRONMENTAL HEALTH COMMITTEE**

FOREWORD

The Environmental Health Committee is a General Standing Committee of the Society and operates under the direction of the Board of Directors and Technology Council. The Rules of the Board (ROB) for the Environmental Health Committee (EHC) is the constitution of the committee. Proposed changes to the ROB and its appendices must be approved by the Board of Directors.

A Manual of Procedures of a council or committee is a document developed within the council or committee to describe the methods and procedures by which the council or committee accomplishes the duties and responsibilities assigned to it. The manual is an internal document of the council or committee for its own guidance. The council or committee MOP requires approval of the council (96-02-18-07). The MOP further details the duties of the council/committee. It also describes the responsibilities of assigned members, subcommittee organization, and the procedure for revising rules. MOP appendices, if any, describe special functions of the council/committee requiring BOD approval. (ROB 1.100.002.4)

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SECTION A - ENVIRONMENTAL HEALTH COMMITTEE - GENERAL

Part 1 Responsibilities/Duties

- A1.1 The Environmental Health Committee shall be responsible for identifying major environmental health trends impacting the practice of HVAC&R, informing the ASHRAE leadership and membership of these trends and their potential impacts, and making recommendations on new activities and policies in response to these trends. In addition, this committee shall serve as a resource to the Society on activities and issues that relate to environmental health impacts of building environmental control technologies including but not limited to ventilation, and thermal conditioning. (ROB 2.406.001)
- A1.2 The Environmental Health Committee shall serve as the coordinator (or, if necessary, the provider) of expertise in the health sciences, both from within and outside the Society membership proper, when such needs are made known to it or are otherwise apparent.
- A1.2.1 The Environmental Health Committee is expected to interact with ASHRAE committees and organizations outside of the Society whose scopes impact environmental health or indoor air quality.
- A1.3 The Environmental Health Committee shall review, coordinate and if necessary, initiate, ASHRAE research in areas relating to Environmental Health. The Committee's role in ASHRAE research is not intended to overshadow or supplant the role of other ASHRAE entities having environmental health concerns -- but is intended to coordinate Environmental Health activities and to ensure that important issues are addressed.
- A1.4 The Environmental Health Committee shall ensure that ASHRAE members are provided with opportunities to keep themselves adequately informed on environmental health issues of interest to the Society. Among the methods for accomplishing this include maintaining the ASHRAE Handbook chapter on Environmental Health, sponsoring programs at Society meetings on environmental health and indoor air quality issues, and working with appropriate Society committees to develop educational courses, publications and other materials.
- A1.5 The Environmental Health Committee is responsible for organizing, reviewing and recommending articles for the [IEQIAQ](#) Applications Column of ASHRAE Journal.
- A1.6 The Environmental Health Committee shall regularly review its Rules of the Board and Manual of Procedures and, when necessary, recommend changes.
- A1.7 EHC shall deliver Emerging Issues [Briefs \(EIB\)Reports](#) to Technology Council on topical environmental health issues. These [briefsreports](#) shall be delivered to Technology Council for inclusion in their reports to the BOD and posted on the EHC website.

Part 2 Membership

- A2.1 Members of the Environmental Health Committee shall have specialized professional experience in the areas of environmental health and/or indoor air quality related to HVAC. Refer to ROB 2.406.002 for specific requirements on membership composition.
- A2.2 Service on this committee is intended to be for a 3-year period. Appointments are made, however, each year by the President-Elect for the administrative year covered by his/her term as president.

Part 3 Meetings

A3.1 Number

- A3.1.1 The Environmental Health Committee is authorized to hold four meetings per year. (ROB 2.105.001).
- A3.1.2 Face to face meetings in excess of ~~two~~~~four~~ authorized meetings may be called by the chair upon approval by the Society President or Coordinating Officer. (ROB 2.104.002.1)
- A3.1.3 A meeting of the committee will be held at each Annual and Winter Meeting of the Society. (ROB 2.104.002.1) One additional meeting ~~may~~~~shall~~ be held in the fall, normally in conjunction with the IAQ conference or Technology Weekend.
- A3.1.4 Additional conference calls between face to face meetings may be called by the chair on as needed basis.

Part 4 Operations

- A4.1 This committee shall maintain a long-range plan for Indoor Air Quality conferences and submit this plan to Technology Council at the ~~A~~~~annual~~ ~~M~~~~meeting~~. (ROB 2.406.003.1)
- A4.2 The budget of this committee may include travel costs for liaison to other groups working on environmental health issues and travel costs to bring members of other societies/groups with needed expertise to meet with this committee. Travel costs (other than normal transportation costs) will be available only for Environmental Health Committee members who have no allegiance to ASHRAE~~;~~ and would attend only to assist with this committee and related activities. (ROB 2.406.003.2)
- A4.3 This committee shall develop procedures for recommending updates to the strategic plan on a continuous basis. As a minimum the committee shall submit a report to the council prior to the ~~A~~~~annual~~ ~~M~~~~meeting~~. The report includes the current status of each activity which supports the fulfillment of the committee's assignments under the strategic plan. The committee shall report to the council all recommendations for changes to the strategic plan as provided by the committee's constituents prior to the Annual Meeting. (ROB 2.406.004)

SECTION B - CHAIR, VICE CHAIRPart 1 Selection

- B1.1 The Chair and Vice Chair of EHC are nominated by the President-Elect of the Society from the current membership of EHC and elected by the Board of Directors to serve one-year terms commencing at the close of the next Annual Meeting of the Society. The vice-chair is generally intended to become the chair in the following year, subject to the President-Elect's nomination.

Part 2 Duties of Chair

- B2.1 The chair shall preside over all meetings of the Environmental Health Committee.
- B2.2 The chair shall prepare the agenda for all Environmental Health Committee meetings.
- B2.3 The chair shall ensure the minutes are recorded for all Environmental Health Committee meetings.
- B2.4 The chair shall prepare reports to be submitted to the Technology Council at the Annual, Winter, Spring and Fall meetings of the Technology Council.
- B2.5 The chair is responsible for developing committee objectives, developing action plans to address the Society Strategic Plan Objectives ~~assigned to the committee~~ and for keeping the committee Manual of Procedures up to date. They may assign some or all ~~of~~ these responsibilities to individual members of the committee or to sub-committees.
- B2.6 The chair shall submit annually to the President-Elect of ASHRAE recommendations for membership of the Environmental Health Committee for the following year.
- B2.7 The chair shall, as needed, appoint committee members to serve as liaison to technical committees, task groups or general committees of the Society and to appropriate groups outside of the Society. Any inter-society liaisons shall be appointed and approved in accordance with Rule of the Board.
- B2.8 The Chair shall organize, subject to the approval of the committee, EHC subcommittees as necessary to satisfy the needs of the committee as indicated in the EHC Reference Manual.
- B2.9 The Chair shall annually appoint, subject to the approval of the committee, ~~members of the EHC to the EHC subcommittees and shall designate each subcommittee's Chair.~~
- B2.10 The Chair shall appoint an incumbent member to be the mentor for an incoming member, as indicated in the EHC Reference Manual.
- B2.11 The Chair shall appoint, subject to the approval of the committee, ad hoc committees or working groups from the membership of the EHC, the Society or from experts outside the Society, whenever necessary in order to assist in fulfilling their responsibilities of EHC.
- B2.12 The Chair will typically serve as a member of the Operations & Planning Subcommittee of Technology Council, as appointed by the Technology Council Chair. The Chair shall prepare recommended budgets for the operation of the EHC and the environmental health program for the coming fiscal year for consideration by the EHC and Technology Council. Periodically, the Chair shall review with the EHC expenditures and budget allocations and shall take any action they deem necessary, in cooperation with the Executive Vice President and the Director of Technology, to stay within the established budget.

Part 3 Duties of Vice Chair

- B3.1 In the absence of the chair, the vice chair shall assume the chair at all scheduled or called meetings of the Environmental Health Committee.
- B3.2 The Vice Chair will typically serve as a member of the Document Review Subcommittee (DRSC). The Vice Chair shall review the documents assigned to the DRSC for review and recommended approval to Tech Council. These documents include the Position Documents and Public Policy Briefs for Society. ~~Financial Planning Subcommittee of the Technology Council as~~

~~appointed by the Technology Council Chair. The Vice Chair shall prepare recommended budgets for the operation of the EHC and the environmental health program for the coming fiscal year for consideration by the EHC and Technology Council. Periodically, the Vice Chair shall review with the EHC expenditures and budget allocations and shall take any action they deem necessary, in cooperation with the Executive Vice President and the Director of Technology, to stay within the established budget.~~

- B3.3 The vice chair shall perform other duties which may be assigned by the chair.
- B3.4 In the event the chair is unable to perform their duties, the vice chair shall assume all ~~of~~ the duties of the chair until a successor is appointed.
- B3.5 Prior to the Society Annual Mmeeting, the committee vice chair or the individual who will be the next year's chair will prepare MBOs for the committee for the next year and present these objectives to EHC for review at the EHC meeting held during the Society Annual Mmeeting. The MBOs will be included in the EHC report to Technology Council at the Annual Mmeeting as an information item, and a copy of the MBOs will be sent to headquarters staff (Assistant to the BOD).

SECTION C DUTIES OF THE CONSULTANT, DIRECTOR AT LARGE, AND STAFF LIAISON

Part 1 Duties of Consultants

- C1.1 Consultants shall be a non-voting member of the committee and shall participate fully in all called meetings and deliberations of the committee.
- C1.2 Consultants shall assist the committee leadership in developing strategy, identifying industry and society issues, and developing appropriate response activities for the Society.
- C1.3 Consultants shall assist the committee in coordinating its efforts within ASHARE and in collaboration with relevant external organizations.
- C1.4 Consultants shall assist the committee in linking with external organizations having consistent concerns and objectives as EHC.

Part 2 Duties of the Director at Large (DAL) who serves as the Board Ex Officio (Ex-O) to EHC

- C2.1 The DAL shall keep the Coordinating Officer (CO) informed of any deliberations or resolutions of the EHC which may affect the general policies of the Society.
- C2.2 The DAL shall serve the EHC in an advisory capacity and shall provide liaison with the Board of Directors (BOD), Technology Council, and the President-Elect Advisory Committee.
- C2.2.1 The DAL shall assist the committee in preparing its recommendations to Technology Council and the BOD and present any motions recommended by EHC to the council.
- C2.2.2 The DAL shall interpret actions of the council and the BOD regarding the motions recommended by EHC.
- C2.2.3 At EHC meetings, the DAL does not count toward a quorum and does not vote.

- C2.3 The DAL shall provide support to the EHC as follows:
1. Communication and interpretation of presidential goals.
 2. Guidance in fiscal planning.
 3. Assistance in preparing annual MBOs.
 4. Monitoring of progress toward completion of annual MBOs.
 5. Assistance in developing action plans to achieve Strategic Plan objectives.
 6. Monitoring of progress toward completion of Strategic Plan objectives.
 7. Ongoing review of the committee's ROB and MOP.
- C2.4 The DAL shall assess the committee's scope, operation and personnel and shall suggest changes as needed.
- C2.5 The DAL shall attend all meetings of the EHC other than those that conflict with higher priority duties.

Part 3 Duties of Staff Liaison

- C3.1 A member of the Technology staff shall serve as staff liaison to the Environmental Health Committee.
- C3.2 The staff liaison shall prepare and distribute minutes of meetings of the Environmental Health Committee.
- C3.3 The staff liaison shall distribute copies of rosters of the Environmental Health Committee to committee members.
- C3.4 The staff liaison shall direct inquiries or information received at headquarters to the Chair or appropriate members of the Environmental Health Committee.
- C3.5 The staff liaison shall distribute information or materials to members of the Environmental Health Committee as requested by the Chair.
- C3.6 The staff liaison shall assist with budget preparation.
- C3.7 The staff liaison shall distribute the MBO's to EHC members and Chairs of relevant TC/TGs.
- C3.8 The staff liaison shall prepare the scoring analysis for the Donald Bahnfleth Environmental Health Award.
- C3.9 The staff liaison shall maintain the documentation history for EHC on the Society approved document control platform. This shall include, but not limited to, past meeting notes, emerging issue briefs, position documents, and IEQ journal.

SECTION D – EXECUTIVE COMMITTEE

Part 1 Responsibilities

- D1.1 The Environmental Health Executive Committee (ExCom) shall have the following responsibilities:

- a) Recommend changes in policy.
- c) Assist in preparation of budgets for the EHC.
- c) Assist in preparation of agendas for EHC meetings.
- d) Periodically review the EHC ROB and Manual of Procedures.
- e) Exercise the powers and carry out the purposes of the EHC during intervals between meetings.

Part 2 Membership

D2.1 The members of the Environmental Health Executive Committee include the following:

EHC Chair

~~EHC -and Vice Chair -and the chairs of the standing subcommittees.~~

Subcommittee Chairs

D2.2 The following Ex-Officio members of the Environmental Health Executive Committee may participate in the discussions but are not eligible to vote:

Assistant Manager of Research and Technical Services (AMORTS)

Director of Technology

Board Ex - Officio

Coordinating Officer

Member Outside North America

Consultants to EHC

Part 3 Meetings

D3.1 The Environmental Health Executive Committee shall meet three (3) times per year before the scheduled time of the EHC meeting at the Annual and Winter Meetings of the Society and before the ~~F~~fall ~~M~~meeting of the EHC. Additional meetings may be scheduled as needed.

SECTION E – SUBCOMMITTEES

- E1.1 Standing Subcommittees of the EHC are organized by the Chair as necessary to satisfy the needs of the committee.
- E1.2 Ad hoc subcommittees may be appointed by the Chair of the committee with the approval of EHC.
- E1.3 The Chair shall form additional subcommittees as needed to conduct the business of the EHC in a practical and efficient manner. As conditions change, the Chair may dissolve these subcommittees. Both their appointment and dissolution requires approval of EHC.
- E1.4 The Chair shall appoint the members and chair of each subcommittee, with the consent of EHC. The chair of each subcommittee must be a member of EHC. At least three subcommittee members should be members of the EHC, but the Chair may appoint additional subcommittee members who are not members of the EHC when there is a need for members who have expertise and experience in certain areas that are of immediate importance and not available from the EHC members.
- E1.5 Subcommittee members are appointed for the Society year. If a member's term of service on the committee continues into the next Society year, they may be re-appointed to the same or different subcommittee by the incoming Chair.

- E1.6 The subcommittees shall meet at least two (2) times per year at the Annual and Semi-Annual Society meetings.
- E1.7 ~~The subcommittees shall meet at least two (2) additional times per year via conference calls between the face to face meetings. The subcommittee Chair shall report subcommittee activities at the appropriate point in the agenda of the EHC meeting and provide a written report to be included in the report for Tech Council.~~
- E1.8 The subcommittee Chair shall report subcommittee activities at the appropriate point in the agenda of the EHC meeting and provide a written report to be included in the report for Tech Council.

Environmental Health
Committee
(EHC)

(Comité de Salud Ambiental)

-Reference Manual

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History of EHC

The Environmental Health Committee (EHC) was established as a result of a number of issues that converged in the early 1980's. Up until then, environmental health issues were handled by Dr. Robert Horton, an ex-EPA employee, who acted as a medical consultant on retainer to the ASHRAE Board of Directors. His resignation and subsequent death left a void in this area of expertise. Concurrently, indoor air quality concerns were growing in response to the increasing reports of building related illness as well as the resulting litigation. Concurrently, a number of other societies and associations started to lay "claim" to the IAQ issue. In reaction to these factors, then President Don Bahnfleth formed an Ad Hoc Committee under the leadership of Dr. Ralph Goldman to study the issue and provide guidance to the Society. Out of recommendations from that study came the formation of the Environmental Health Committee in 1985, created as a Standing Committee initially chaired by Dr. Goldman. The committee was to be made up of experts from areas outside the normal expertise of ASHRAE membership, such as public health, physiology, epidemiology, industrial hygiene and microbiology. The new body was to report to the Board through the newly formed Technology Council and was to act as a consultant to the Board on matters concerning health. Concurrently, President Bahnfleth initiated the first ASHRAE IAQ Conference convened in the spring of 1986, which was later assigned to the EHC as the cognizant committee.

The early years of the committee were challenging as the committee learned its role, gained acceptance by other groups within the Society, and learned how to deal with Society process and procedures. However, the committee membership included some of the best-known and respected authorities on IAQ in the world. The eventual success of the committee effort is evident in that IAQ (once an "orphan" within ASHRAE) is now fully integrated into the program, research and technology outreach of the Society. There is now IAQ and environmental health material in the ASHRAE Handbooks, and the IAQ conference series is one of the premier technical conferences in the industry. The Society has also maintained a leadership role on the HVAC side of indoor environmental issues ~~in spite of despite a large number of many~~ special interest groups and other organizations in the field.

EHC Subcommittees

The EHC Chair can create or disband subcommittees of EHC. They also determine the involvement of the EHC members on those subcommittees. There are currently four (4) subcommittees for EHC:

- Policy
- Education
- Coordination and Outreach
- ExCom

<u>Sub-Committee</u>	<u>Charge</u>	<u>Interaction between Subcommittees</u>	<u>Task Description</u>
<u>Policy</u>	<u>Identify major environmental health trends impacting HVAC&R</u>	<u>Ask all EHC to send ideas</u>	<u>Brainstorm - PD, EIB, RP</u>
-	<u>Recommend New activities</u>	-	
-	<u>Recommend Policies that EHC should consider (EIB, PD, RP)</u>	-	<u>Brainstorm for what should be researched and think about by whom</u>
-	<u>Position Document Oversight</u>	-	<u>Develop the idea and the document - these are quick</u>
-	<u>Create EIB</u>	-	
-	-	-	
<u>Education</u>	<u>IEQ Column</u>	-	<u>Lead the IAQ column</u>
-	<u>Potential Conference Programs</u>	-	<u>Brainstorm for programs to team with other Comm or TC</u>
-	<u>Handbook Chapter</u>	-	<u>- not necessarily for us to create unless we feel it is needed and we are the experts</u>
-	<u>Educational courses</u>	-	
-	-	-	<u>Lead the update of the chapter, pull from the Policy for new ideas</u>
<u>Coordination and Outreach</u>	<u>Interact with ASHRAE committees</u>	<u>Understand the RP from Policy, Understand the programs from Education</u>	<u>Take the concepts from Policy and PDs to find leads for those items that we can help support internal and external to ASHRAE.</u>
-	<u>Interact with outside organizations that impact EH or IAQ</u>	-	
-	<u>IAQ Conferences</u>	-	<u>Review RTARs to see if we want to support / take RP from Policy to other groups for them to lead</u>
-	<u>IEQ-GA</u>	-	
-	<u>Research RTAR Review and New RP Development with other groups</u>	-	

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ExCom	<u>Developing report to Tech Council per MOP</u>	-	
-	<u>Submit Long Range Plan for IAQ Conferences to Tech Council</u>	-	
-	<u>Create MBOs that align with Strategic Plan</u>	-	
-	<u>EH Award</u>	<u>Ask entire EHC to think of candidates</u>	<u>Try to find candidates for the Award, Promote the winner</u>
-	<u>Assign Mentors to new members</u>	-	
-	<u>EHC Budget</u>	-	
-	<u>Review ROB, MOP, and Ref Manual</u>	-	

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Interested Parties

Staff shall compile and maintain an email list including past EHC members, meeting attendees, and any others who indicate an interest in receiving electronic updates on EHC meetings and activities. Staff shall update the list after each EHC meeting and offer an option to be removed from the list if they wish. Staff shall distribute draft meeting minutes, agenda, and other information deemed appropriate by EHC to this distribution list.

Additionally, staff will continue to maintain the EHC page of ASHRAE website to post past meeting minutes, current EHC procedures, and other information determined appropriate by EHC.

EHC Documents

EHC is the cognizant committee over many documents that include a handbook chapter, guidelines, emerging issues briefs, position documents, IEQ Journal articles, and others.

Handbook Chapter(s):

- ASHRAE Fundamentals Chapter 10 Indoor Environmental Health

Special Publication(s), Standard(s) and Guideline(s)

- Indoor Air Quality Guide – Best Practice for Design, Construction, and Commissioning
- Residential Indoor Air Quality Guide - Best Practice for Home Design, Construction, Operation, and Maintenance
 - Research Project 1663
- Guideline 10-2016 - Interactions Affecting the Achievement of Acceptable Indoor Environments
 - Also published in 2011
- Guideline 12-2020 – Managing the Risk of Legionellosis Associated with Building Water Systems
 - Co-cognizant with TC 3.6 and TC 6.6
 - Also published in 2000
- Standard 188-2018 – Legionellosis: Risk Management for Building Water Systems
 - Co-cognizant with TC 3.6 and TC 6.6
 - Also published in 2015

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Position Documents:

These are governed and approved by the Tech Council Document Review Subcommittee. These are eight (8) page technical descriptions of issues and concerns of ASHRAE that indicated positions that ASHRAE should take with regards to the built environment. There is a Position Document Committee (PDC) that is formed under a cognizant committee, in our case it is EHC. The PDC, Cognizant Committee, DRSC, Tech Council, and the ASHRAE Board of Directors must all approve a PD for it to be published by ASHRAE.

EHC is the cognizant committee for the following PDs:

<u>Title</u>	<u>Expiration Date</u>	<u>Next Decision Date</u> ^{2,3}
<u>Indoor Air Quality</u>	<u>6/28/2020</u>	<u>January 2020</u>
<u>Environmental Tobacco Smoke</u>	<u>6/29/2019</u>	<u>January 2019</u>
<u>Infectious Aerosols</u>	<u>1/31/2020</u>	<u>July 2019</u>
<u>Limiting Indoor Mold Growth and Dampness in Buildings Systems</u> ⁴	<u>6/27/2021</u>	<u>January 2021</u>
<u>Filtration and Air Cleaning</u>	<u>1/23/2021</u>	<u>July 2020</u>
<u>Combustion of Solid Fuels and Indoor Air Quality in Primarily Developing Countries</u>	<u>10/03/2019</u>	<u>April 2019</u>
<u>Unvented Combustion Devices and Indoor Air Quality</u>	<u>1/23/2021</u>	<u>June 2020</u>

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<u>In Process</u>	<u>Expiration Date</u>	<u>Next Decision Date</u> ^{2,3}
<u>Indoor Carbon Dioxide</u>	<u>NA</u>	<u>NA</u>

<u>Retired</u>	<u>Expiration Date</u>	<u>Next Decision Date</u> ^{2,3}
<u>Legionellosis</u>	<u>1/25/2015</u>	<u>NA</u>

Mentoring Program

~~During the final meeting of the Fiscal Year, the Board of Directors/Board of Governors, Council or Committee Chair shall appoint an incumbent to be the mentor for an incoming member. A mentor should be appointed for each new member. The mentor will be responsible for the following tasks:~~

- ~~• Before the next meeting of the Board of Directors/Board of Governors, Council or Committee Meeting, the mentor should contact the new member by telephone, letter, fax or email to introduce himself/herself and explain the new relationship and its purpose.~~
- ~~• The mentor should make every effort to update the new member on:

 - ~~1. Board of Directors/Board of Governors, Council, Committee or Chapter functions, focus and objectives.~~
 - ~~2.1. Review the Rules of the Board (ROB) and Manual of Procedures (MOP) with the new member.~~
 - ~~3.1. Discuss the typical meeting format and member duties and responsibilities.~~~~
- ~~• The mentor should plan to meet the new member before the respective meeting is scheduled to start and introduce them to the chair and early arriving members. The mentor should also introduce the new member with pertinent data such as:

 - ~~1. Member's field of expertise and employer~~
 - ~~2.1. Chapter and city of the new member~~
 - ~~3.1. Former chapter, region and Society positions previously held by the new member~~~~
- ~~• The new member will be sent a copy of the group Rules of the Board (ROB), Manual of Procedures (MOP) and a copy of the most recent meeting minutes to acquaint them with the function and focus of the group. The new member should be encourage to develop a rapport with other members to effectively work with fellow members to maximize productivity.~~

~~The chair of the Board of Directors/Board of Governors, Council, Committee or chapter shall have the following responsibilities:~~

- ~~1. Assign a mentor to each incoming new member of the group prior to the first meeting.~~
- ~~2.1. Assure that the time allotted at the beginning of the first meeting is sufficient for proper introduction of the new member by the assigned mentor.~~
- ~~3.1. Assess at a later meeting the effectiveness of the mentor/new member relationship.~~
- ~~4.1. Provide any assistance to enhance the mentor/new member relationship.~~

~~Completion date: The relationship terminates at the end of the new member's first year in the group.~~

SUGGESTED MBO FORMAT

OBJECTIVES

_____ Committee

Chairman: _____

Society Year: 200____-200____

Date: _____

Objective	Planned Completion Date	Fiscal Impact	Responsibility	Program Approved	Cost Budgeted	Status

- List objectives, not action items or ongoing committee activities such as updating the committee's MOP.
- State objectives in clear, concise, measurable language. If necessary, cite sub-tasks and interim steps as a means of measuring objective completion.
- Cite both the completion date for the overall objective as well as individual sub-tasks.
- State fiscal impact in dollars, man-hours, or man-trips. State whether the program has been approved by the council and whether its cost has been included in the budget.
- State the primary responsible individual, subcommittee, or body.
- Report a brief but complete statement of status. Cite completion date if objective is fulfilled.

ENVIRONMENTAL HEALTH AWARD

EHC Education Sub-Committee will annually review all eligible nominations received and make a recommendation to the Environmental Health Committee for its consideration prior to the ASHRAE Winter Meeting based on the following procedures

PROCEDURES FOR THE DONALD BAHNFLETH ENVIRONMENTAL HEALTH AWARD

1. Purpose. The purpose of the award is to recognize excellence in volunteer service focused on environmental health issues. It will serve to heighten general membership awareness of, and interest in, environmental health activities.
2. Award Presentation. Each year the Society recognizes the outstanding efforts of a single volunteer in the area of environmental health activities. Nominations are solicited during the first half of the Society year. The Environmental Health Committee will select the recipient and notify the Honors and Awards Committee of its selection at the ASHRAE Winter Meeting.
A typical award application will include a letter of nomination outlining eligibility and a nomination form.
3. Eligibility Requirements. The award is open to ASHRAE members and non-members who have demonstrated outstanding achievement in the ASHRAE environmental health activities. The recipient will be selected from all nominations that meet a 10 point minimum the requirement as outlined under Section 7 Criteria for Selecting Recipients. Environmental Health Committee Members and Technology Council members are ineligible for receipt of the Environmental Health Award during the terms they serve on the respective committees.
4. Judging. Environmental Health Education Sub-Committee will review all eligible nominations received and make a recommendation to the Environmental Health Committee for its consideration at the ASHRAE Winter Meeting. The award may be omitted if a suitable candidate is not identified.
5. Presentation. The Environmental Health Award is presented during the Honors and Awards portion of the Plenary Session at the ASHRAE Annual Meeting. A certificate is presented to the recipient by the ASHRAE President.
6. Application. A nomination for the Environmental Health Award should include a cover letter outlining the nominee's environmental health activities in ASHRAE. This summary should contain an explanation, approximately 100 words, of the nominee's qualifications.
7. Criteria for Selecting Recipients. Following is an outline of how points are awarded.

A. ASHRAE activities

- | | |
|--|--------------------------------------|
| 1. Chair of an ASHRAE sponsored environmental health program | 2 points / program |
| 2. Presenting at an ASHRAE sponsored environmental health program | 1 point / program |
| 3. Chair of a Position Document (PD) Committee | 2 points / PD |
| 4. Member of a Position Document (PD) Committee | 1 point / PD |
| 5. Lead Reviewer of a handbook chapter related to health | 1 point / chapter |
| 6. Member of a Standard or Guideline PC related to health (see list below) | 1 point / PC ¹ |
| 7. Chair of a Standard or Guideline PC related to health (see list below) | 1 additional point / PC ² |

B. IAQ-Conference experience

- | | |
|-----------------------------------|-----------------------|
| Chair of an IAQ conference | 2 points / conference |
| Member of an organizing committee | 1 point / conference |
| Presentation at a conference | 1 point / conference |

C. Environmental Health Committee Experience

- | | |
|--|---|
| 1. Member | 1 point / tour ³ |
| a. Sub-Committee Chair | 1 additional point / tour ³ |
| b. Chair of the Environmental Health Committee | 2 additional points / tour ³ |

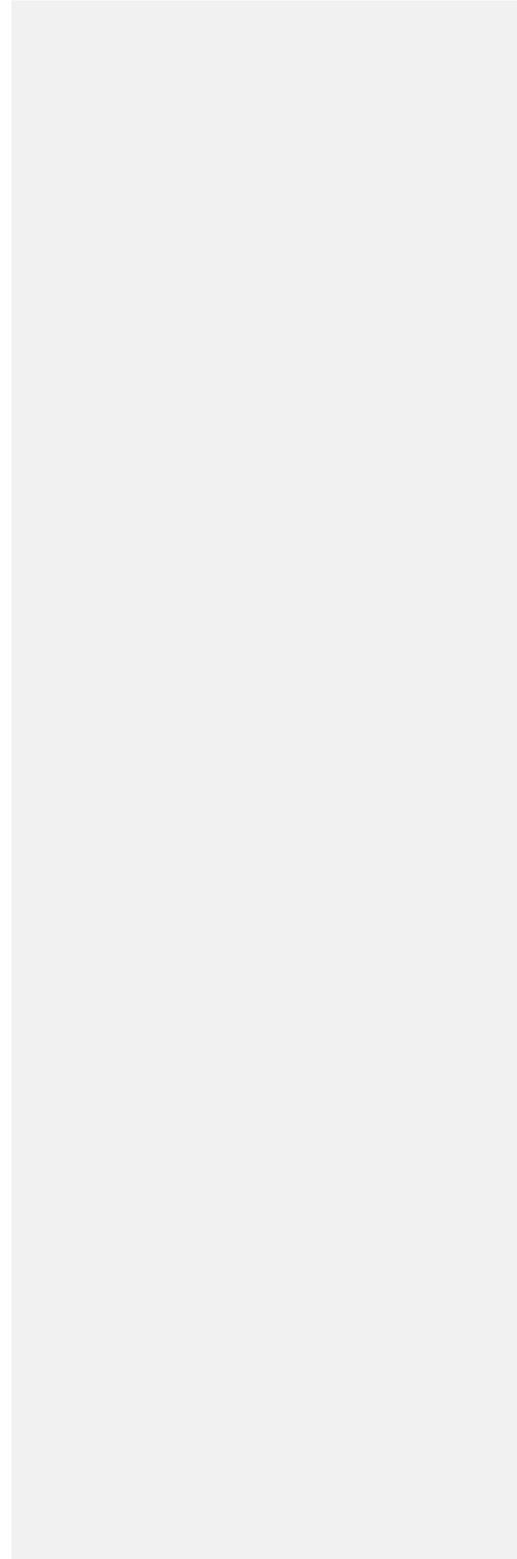
¹ For standing committees "Project Committee" refers to a 4-year term

² For standing committees "Project Committee" refers to a 2-year term

³ "Tour" refers to a 3-year term

List of eligible Standard and Guideline Project Committees:

- Committees for which EHC is the cognizant committee
- SSPC 62.1
- SSPC 62.2
- SSPC 170



Sample Letter Ballot

Re: EHC Award

Please find attached the letters of nomination and ASHRAE biographies for the three candidates for the EHC Award. The nominators and candidates respectively are:

- H.E. Burroughs (heburroughs@mindspring.com) – H.E. Burroughs
- Lawrence Schoen (Larry@SchoenEngineering.com) – Ole Fanger
- David Levin (hal.levin@buildingecology.com) – David Grimsrud

EHC's recommendation must be approved by Honors and Awards (H&A) at the Dallas meeting if the award is to be presented at the 2007 annual meeting in Long Beach, CA. Due to The Dallas committee meeting schedule we need to conduct an e-mail ballot so that our recommendation can be approved by H&A. If you have any questions on the candidates, please e-mail the nominator directly and copy the EHC members.

I would appreciate your e-mail response, prior to 12:00 AM EST, Tuesday, January 23rd. Our recommendation will be based on the candidate who receives a majority of the votes received

Sample Insight Article about EHC Award

ENVIRONMENTAL HEALTH AWARD by Ron Kessner, Environmental Health Committee (EHC)

EHC has a new award that will recognize excellence in volunteer service focused on environmental health issues. The award is open to ASHRAE members and non -members who have demonstrated outstanding achievement in ASHRAE environmental health activities. The recipient will be selected from a pool of nominations that meet a 10 point minimum requirement as outlined under Criteria for Selecting Recipients. The award will be presented at the Annual Society Plenary Session in June 2007. Environmental Health Committee Members and Technology Council members are ineligible to receive the Environmental Health Award during the terms they serve on the respective committees.

A nomination for the Environmental Health Award should include a cover letter outlining the nominee's environmental health activities in ASHRAE. This cover letter should contain approximately a 100 word explanation of the nominee's qualifications. If the nominee is an ASHRAE member a current biographical record should be included.

Criteria for Selecting Recipients

A. ASHRAE activities

1. Chairing an environmental health program 2 point per tour
2. Presenting at an environmental health program 1 point per tour
3. Chair of the Position Document Committee 2 point per tour
4. Member of the Position Document Committee 1 point per tour
5. Lead Reviewer of a handbook chapter related to health 1 point per tour
6. Chair of a Guideline Committee related to health 2 point per tour
7. Member of the Guideline Document Committee 1 point per tour

B. IAQ-Conference experience

- Chair of an IAQ conference 2 point per tour
- Member of an organizing committee 1 point per tour
- Presentation at a conference 1 point per tour

C. Environmental Health Committee Experience

1. Member 1 point per year
 - a. Sub-Committee Chair 1 additional point per year
 - b. Chair of the Environmental Health Committee 2 additional points per year

Please forward your nomination postmarked prior to **January 12, 2007 to:**

Steve Hammerling, Assistant Manager of Research & Technical Services
 American Society of Heating, Refrigerating and Air -Conditioning Engineers, Inc...
 Direct Line: 678-539-1158 Fax: 678-539-2158

Email: shammerling@ashrae.org

Mentoring Program

During the final meeting of the Fiscal Year, the Board of Directors/Board of Governors, Council or Committee Chair shall appoint an incumbent to be the mentor for an incoming member. A mentor should be appointed for each new member. The mentor will be responsible for the following tasks:

- Before the next meeting of the Board of Directors/Board of Governors, Council or Committee Meeting, the mentor should contact the new member by telephone, letter, fax or email to introduce himself/herself and explain the new relationship and its purpose.
- The mentor should make every effort to update the new member on:
 1. Board of Directors/Board of Governors, Council, Committee or Chapter functions, focus and objectives.
 2. Review the Rules of the Board (ROB) and Manual of Procedures (MOP) with the new member.
 3. Discuss the typical meeting format and member duties and responsibilities.
- The mentor should plan to meet the new member before the respective meeting is scheduled to start and introduce them to the chair and early arriving members. The mentor should also introduce the new member with pertinent data such as:
 1. Member's field of expertise and employer
 2. Chapter and city of the new member
 3. Former chapter, region and Society positions previously held by the new member
- The new member will be sent a copy of the group Rules of the Board (ROB), Manual of Procedures (MOP) and a copy of the most recent meeting minutes to acquaint them with the function and focus of the group. The new member should be encouraged to develop a rapport with other members to effectively work with fellow members to maximize productivity.

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2. Assure that the time allotted at the beginning of the first meeting is sufficient for proper introduction of the new member by the assigned mentor.
3. Assess at a later meeting the effectiveness of the mentor/new member relationship.
4. Provide any assistance to enhance the mentor/new member relationship.

Completion date: The relationship terminates at the end of the new member's first year in the group.

SUGGESTED MBO FORMAT

OBJECTIVES

_____ Committee

Chairman: _____

Society Year: 200_____ - 200_____

Date: _____

<u>Objective</u>	<u>Planned Completion Date</u>	<u>Fiscal Impact</u>	<u>Responsibility</u>	<u>Program Approved</u>	<u>Cost Budgeted</u>	<u>Status</u>

- List objectives, not action items or ongoing committee activities such as updating the committee's MOP.
- State objectives in clear, concise, measurable language. If necessary, cite sub-tasks and interim steps as a means of measuring objective completion.
- Cite both the completion date for the overall objective as well as individual sub-tasks.
- State fiscal impact in dollars, man-hours, or man-trips. State whether the program has been approved by the council and whether its cost has been included in the budget.
- State the primary responsible individual, subcommittee, or body.
- Report a brief but complete statement of status. Cite completion date if objective is fulfilled.

Revisions to Manuals of Procedures (MOP)

2.1 Revisions to this MOP must be approved by this committee and by Technology Council or designated council subcommittee.

2.2 Proposed changes to the MOP shall be submitted to Technology Council for consideration at their Technology Weekend meeting.

**Guidelines for Proposing Changes to
Rules of the Board (ROB)**

ROB 3.400, Manual of Procedures for Officers and Directors, Section 10.3:

10.3 RULES OF THE BOARD

10.3.1 Rules of the ASHRAE Board of Directors, authorized by Bylaws Section 4.3, are compiled annually by the staff of the Society from actions of the Board.

10.3.2 Rules of the Board are contained in the following five volumes:

Volume 1 – Principles, Policies, Position Statements
Volume 2 – Standing Rules for Board, Councils, Committees
Volume 3 – Manuals and Procedures
Volume 4 – Sunset Rules and Interpretations
Volume 5 – Archives

10.3.3 Changes to Rules of the Board - Proposed changes (additions and deletions) to Rules of the Board (ROBs) shall be submitted by committees, councils and Board members. Changes proposed by a committee shall be submitted through the body to which it reports; councils and Board members may submit proposed changes directly to the Board of Directors.

10.3.3.1 To propose a change to an existing ROB, present the current ROB with changes marked by double underlining to designate words proposed to be added and ~~strikethrough~~ to designate words proposed to be deleted. A proposed change, as a minimum, shall include the complete ROB number (e.g., 2.106.001.2), the proposed change(s) marked as indicated above, and the reason(s) for the change(s).

10.3.3.2 To propose a new ROB, present the wording for the new rule and include a statement indicating a recommended placement of the new rule within the ROB organization. Examples:

*It is recommended that this rule be placed in ROB Volume 1, Policies.
It is recommended that this rule be placed in ROB Volume 2, Publishing
and Education Council.*

10.3.3.3 To propose rescinding an existing ROB, include in the recommendation the ROB volume in which the rule is located, the rule number or other identification code, and the wording of the rule to be rescinded.

~~Part 2 Revisions to Manuals of Procedures (MOP)~~

~~2.1 Revisions to this MOP must be approved by this committee and by Technology Council or designated council subcommittee.~~

~~2.2 Proposed changes to the MOP shall be submitted to Technology Council for consideration at their Technology Weekend meeting.~~

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Interested Parties

~~Staff shall compile and maintain an email list including past EHC members, meeting attendees, and any others who indicate an interest in receiving electronic updates on EHC meetings and activities. Staff shall update the list after each EHC meeting and offer an option to be removed from the list if they wish. Staff shall distribute draft meeting minutes, agenda, and other information deemed appropriate by EHC to this distribution list.~~

~~Additionally, staff will continue to maintain the EHC page of ASHRAE website to post past meeting minutes, current EHC procedures, and other information determined appropriate by EHC.~~

MBOs for Environmental Health Committee 2020-2021 (Final)

Wei Sun, Chair

6/20/2020

MBO #	Title	Assignment to Responsible Sub-committee	Comment	Estimated Date / Completion Date	2019 Strategic Plan Alignment Goal.Objective.(Initiative)
Policy					
1	Review published EIB and determine if they need to be retired, reaffirmed, or have a PD created.	Policy		6/1/2021	1.a.(1,2); 3.b.(2,3)
2	Draft a short report to Tech Council which identifies major trends impacting environmental health related with HVACR.	Policy	Itemize each topic with short description in around 50-100 words, the report is of 2 pages maximum.	6/2/2021	1.b.(1,2)
Education					
3	EHC is to submit at least two society technical programs (paper session/seminar/forum) and to serve as a sponsor or co-sponsor for each society meeting.	Education		6/31/2020 & 1/31/2021	1.b.(1,2); 2.a.(1,2)
4	Publish at least 7 articles for IEQ Column per year.	Education/Andy Persily		6/1/2021	1.b.(1,2); 2.a.(1,2)
5	Recruit/assign contributors to start revising the Chapter 10.	Education		6/1/2021	1.a.(2,3,4) 1.b.(1,2)
Coordination and Outreach					
6	Document the interaction plan with IEQ-GA for future IAQ meetings.	Coordination and Outreach/Bill Bahnfleth	Relevant to RoB 2.406.003.1	9/1/2020	2.b.(1,2,4)
7	Document an interaction plan with Epidemic Task Force (ETF).	Coordination and Outreach/Bill Bahnfleth	Relevant to RoB 2.406.003.1	9/1/2020	1.b.(1,2); 2.b.(1,2,4)
8	Develop a short list of research topics with brief descriptions during each society meeting to document and disseminate emerging research ideas to TCs through TAC as inspiration for potential researches.	Coordination and Outreach	Each EHC-related topic/descriptions is around 50-100 words (1-2 pages in total). The goal is idea sharing, not to develop RTARs by EHC.	End of each society meeting	1.b.(1,2,4)
Admin					
9	Review the EHC Scope and Manual of Procedures, recommend to maintain or to revise, present recommendation for new language at annual meeting.	EHC/Staff	Relevant to RoB 2.406.001	6/1/2021	3.b.(3,4)
10	Develop new EIB for concerned items to be published in short order and on ASHRAE website.	Policy/EHC		6/1/2021	1.b.(1,2); 2.a.(1,2)

Chair: Wei Sun

Vice-Chair: Leung Leung

Subcommittees

Policy committee: Khankari (chair)

Education committee: Charlene Bayer (chair)

Coordination/Outreach committee: Nicholas Clements (chair)

ASHRAE 2020 Virtual Conference ►

ASHRAE UPDATE

ExO Report to Committees

ASHRAE 2020 Virtual Conference



CELEBRATING
125
YEARS

In this and all other ASHRAE meetings...

Code of Ethics

“We will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and we shall avoid all real or perceived conflicts of interest.”



Upcoming Conferences



2020 Virtual Conference | June 29-July 2, 2020

- 90+ sessions covering trends and technology in the HVACR industry
- Leadership presentations and addresses
- Virtual social events and professional development
- **Registration is open now! Visit ashrae.org/2020virtual**



2021 Winter Conference & AHR Expo in Chicago, IL | Jan. 23-27, 2021

- Over 100 sessions and topics presented by over 300 speakers
- The world's largest HVACR show
- Social events, tours and professional development
- **Registration opens September 2020, visit ashrae.org/chicago**

Please visit ashrae.org/conferences for the latest updates on these and other conferences

The recent pandemic may have an impact on these events

Upcoming Topical Conferences



2020 Building Performance Analysis Conference & SimBuild Co-organized by ASHRAE and IBPSA-USA | August 12-14, 2020 | Virtual

- **Registration is open now! Visit ashrae.org/BuildPerform2020**



The Fourth International Conference on Efficient Building Design | Postponed to 2021 | Beirut, Lebanon

- **Visit ashrae.org/Beirut**



IAQ 2020: Indoor Environmental Quality Performance Approaches | Postponed to 2021 | Athens, Greece

- **Visit ashrae.org/IAQ2020**



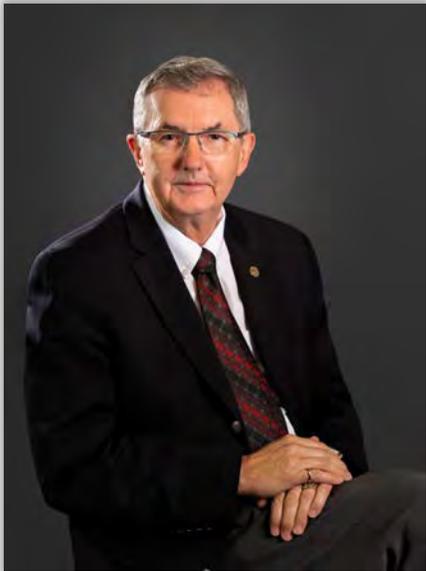
Ventilation 2021: 13th International Industrial Ventilation Conference for Contaminant Control | August 15-18, 2021 | Toronto, Canada

- **Visit ashrae.org/Ventilation2021**

Please visit ashrae.org/conferences for the latest updates on these and other conferences

The recent pandemic may have an impact on these events

Leadership Moments



Leadership Moments taking place at the 2020 Virtual Conference
June 29 – July 2 at 12:30pm

Monday, June 29

State of the Society/Farewell Address
2019-20 ASHRAE President Darryl K. Boyce, P.Eng.

Tuesday, June 30

Secretary's Report
ASHRAE Executive Vice President Jeff Littleton

Wednesday, July 1

ASHRAE Board Recognition

Thursday, July 2

ASHRAE's Vision For the Future
The ASHRAE Digital Lighthouse and Industry 4.0.
2020-21 ASHRAE President Chuck Gulledge, P.E.

Learn more at ashrae.org/2020virtual



Nominations Needed NOW!

- Nominations for appointed standing committees are sought annually
- Speak with your committee ExO if your current appointment ends **June 2021** and you wish to be nominated for another committee Society Year 2021-22
- Self-nomination is also encouraged
- Nominations are due by **mid-February 2021**
- Councils are elected by the Board of Directors, but nominations are welcome
- Council, RAC, TAC, Standards and Handbook nominations are due **mid-September 2020**



For more information, visit: ashrae.org/committee-nominations



ASHRAE Commercialism Policy

ASHRAE's Commercialism Policy allows for Society activities that fulfill the mission of technological advancement with adherence to business plans that generate income to offset operational expenses such as AHR Exposition, ASHRAE periodicals, website, and Society conference events such as the Welcome Party, luncheons, registration kits, and receptions.

Principles for Managing Advertising and Sponsorships

Content should be labeled as advertising or sponsored.

Use of commercial names and logos shall not imply ASHRAE endorsement, approval or certification of products or services.

The inclusion of commercial information shall be fair and unbiased so as to avoid explicit promotion of a product or commercial entity.

Content shall adhere to accepted business practices specified by the U.S. Federal Trade Commission and recognized publishing authorities.

Activities including events at chapter meetings shall be managed to prevent an atmosphere in which commercial entities are encouraged to critique one another in the public forum.

ashrae.org/commercialism



Sexual Harassment

The Society takes Sexual Harassment seriously and does not condone it.

Every employee is given our policy in the Employee Handbook and all members can read our policy here:

<https://www.ashrae.org/about/governance/ashrae-discrimination-and-harassment-policy>

All instances of harassment must immediately be reported in writing to ASHRAE's Executive Vice President.

Any member found to have violated this policy will be subject to disciplinary action, up to and including expulsion from membership in accordance with the Code of Ethics Enforcement Procedures and ASHRAE's Bylaws.

ASHRAE is committed to educating members to eliminate all instances of sexual harassment. The Society will soon deploy an online training program to Society volunteers to help educate and protect all members, and to sustain the professional environment members deserve and expect.

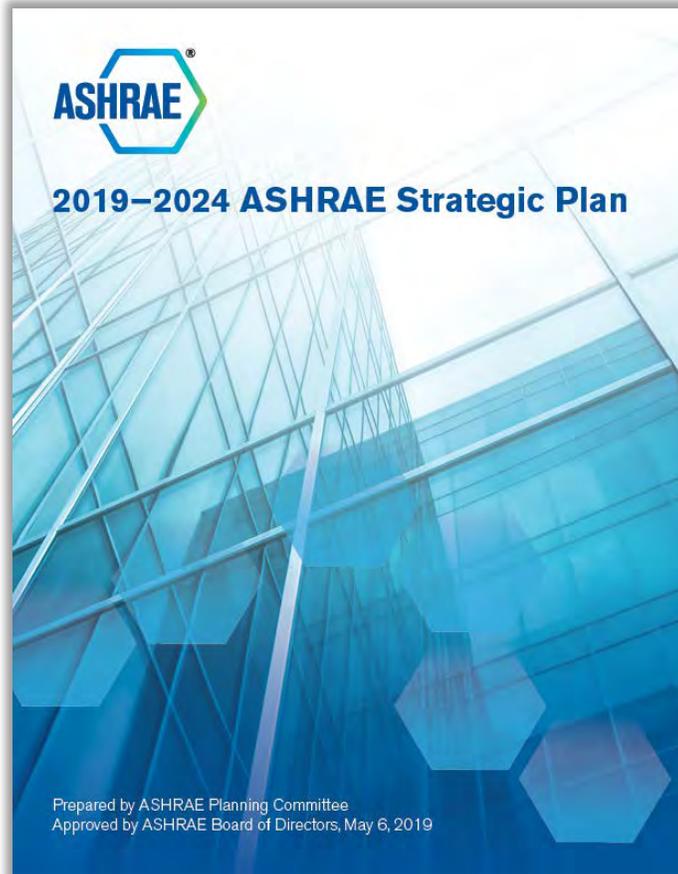
This training will be a requirement prior to serving on certain standing committee and/or leadership position.

Please contact hr@ashrae.org to arrange to take the training before assuming a leadership position.



2019-2024 ASHRAE Strategic Plan

ATTACHMENT E



Mission

To serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration and their allied fields.

Vision

A healthy and sustainable built environment for all.

Strategic Plan Resources available [ashrae.org/strategicplan](https://www.ashrae.org/strategicplan)

- Full **2019–2024 Strategic Plan** in PDF format
- Quick and Simple **Strategic Plan At-a-Glance** in PDF format
- **Strategic Plan Presentations**
 - 2019–2024 ASHRAE Strategic Plan Overview PPT
 - Recordings of *Kansas City Seminar 27: The ASHRAE 2019-2024 Strategic Plan: What and Why* in MP4 format



ASHRAE Vision 2030 and Beyond: Buildings of the Future

The *ASHRAE Vision 2030 And Beyond – Buildings of the Future Presidential Ad Hoc Committee* is being established to position ASHRAE and its members to lead the evolution of buildings during this period of accelerated change.

- Will build and expand upon the ASHRAE report released in June of 2007 *ASHRAE Vision 2020: Producing Net Zero Energy Buildings*.
- Launched jointly by 2019-20 ASHRAE President Darryl Boyce and 2019-20 ASHRAE President-Elect Chuck Gulledge.
- Charged with defining how buildings of the future will be designed and built, what future buildings will look like, and how they will be operated.
- The Ad Hoc Committee should provide an interim report during the Chicago Winter Conference in January 2021 and a final report during the June 2021 Annual Meeting in Phoenix.



Government Affairs

ATTACHMENT E

The mission of ASHRAE's Government Affairs office is to establish ASHRAE as a leading source for expertise in the built environment and a resource for policy-makers in the development of legislation and regulations affecting the public, the HVAC&R community and the engineering profession.

Activities include:

- Coordination of **Semi-Annual Senior Leadership Meetings** in Washington, DC.
 - Government agencies, elected officials, aligned organizations
- **Government Outreach Days** planning and support
 - Connecting ASHRAE volunteer members with their elected officials and policy makers
- **Congressional Briefings & Testimony + Regulatory Meetings/Hearings/Comments**
 - FEMA-DRRA Guidance
 - U.S. Senate Committee on Environmental and Public Works – HFC Phasedown Legislation
 - Congressional Clean Energy Expo and Policy Forum
 - U.S. House Committee on Energy and Commerce – Climate Legislation
- **Letters** related to **GAC Public Policy Priorities**
 - Workforce development, resiliency and disaster recovery, infrastructure, DOE/EERE, Energy STAR and energy tax extenders



ashrae.org/government-affairs



Government Affairs: Member-led Government Outreach Events



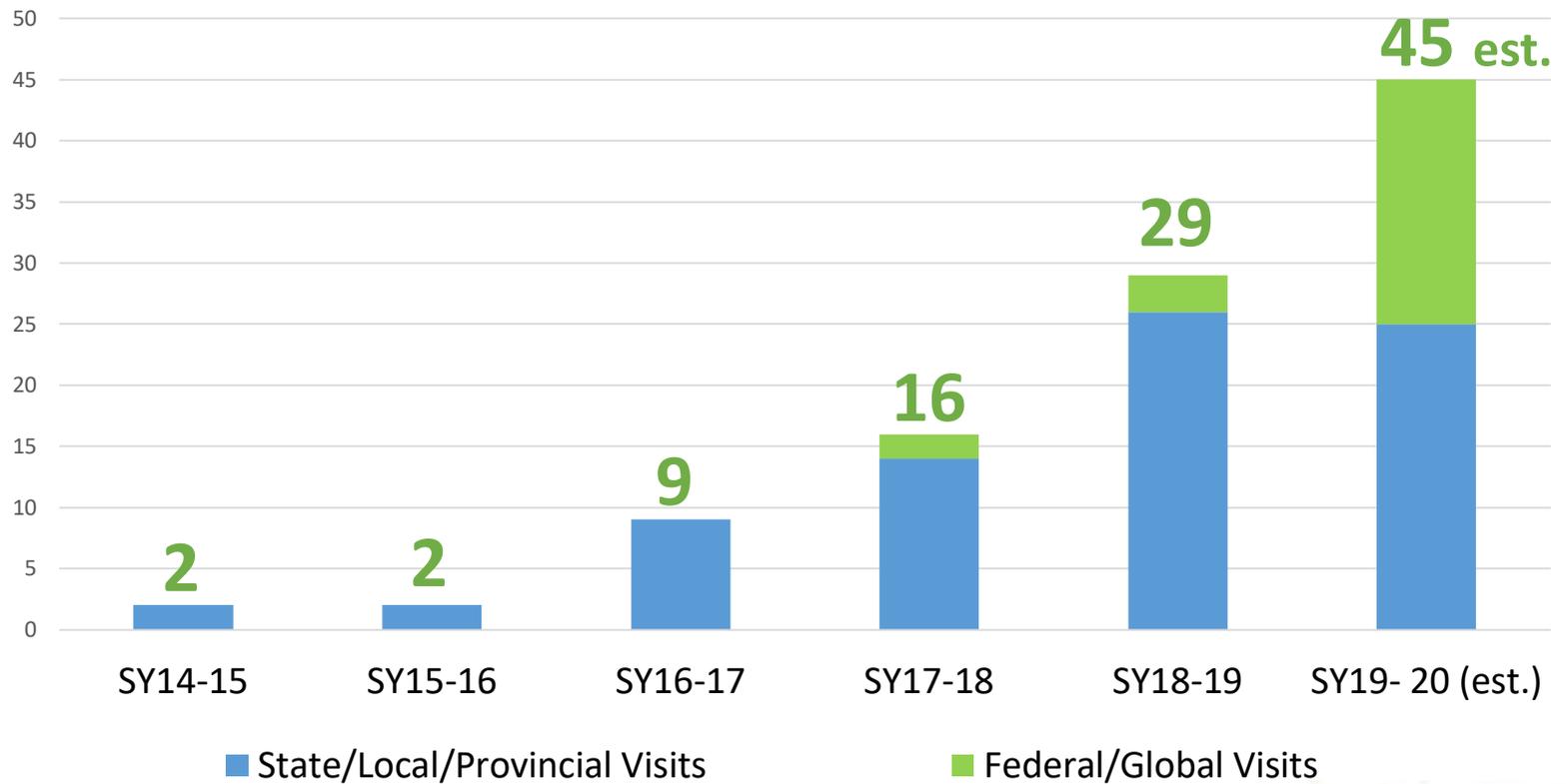
115+ Member Participants



130+ Meetings



5 Virtual Meetings with Lawmakers



ashrae.org/advocacytoolkit

All ASHRAE Members are invited to participate – Get Involved!



Signed Memoranda of Understanding



- American Chemistry Council (ACC)



- APPA: Leadership in Educational Facilities (APPA)



- International Facility Management Association (IFMA)



- National Environmental Balancing Bureau (NEBB)



- National Institute of Standards and Technology – U.S. Department of Commerce (NIST)



- Smart Cities Council



- United Nations Environment Programme (UNEP)

For more information, visit:
[ashrae.org/mous](https://www.ashrae.org/mous)



ASHRAE Epidemic Task Force

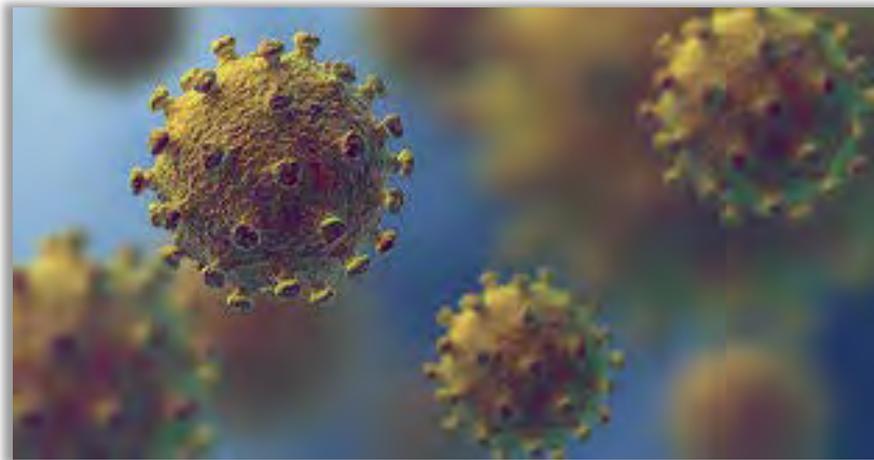
The **primary role of the task force** is to maintain communication with members, industry partners, building owners, facility operators, government agencies and the general public.

- Respond to the current COVID-19 pandemic
 - ✓ Immediate – guidance for immediate implementation (focus on healthcare capacity and emergency operations of other buildings)
 - ✓ Near-term - guidance to prepare for a possible second wave
- Develop resources to mitigate the effects of future epidemics
- Leverage ASHRAE resources to maximize responsiveness

Technical inquiries emailed to
COVID-19@ashrae.org
5-10 technical inquiries/day answered by
Task Force members

ASHRAE Epidemic Task Force

The ASHRAE Epidemic Task Force has been established to help deploy ASHRAE's technical resources to address the challenges of the current pandemic and future epidemics as it relates to the effects of heating, ventilation, and air-conditioning systems on disease transmission in healthcare facilities, the workplace, home, public and recreational environments. The task force will also provide recommendations for setting up temporary field hospitals in convention centers, arenas and indoor stadia to deal with surges.



The Epidemic Task Force's Media Presence

- Close to **20** media interviews
- More than **225,000** visitors to **ashrae.org/COVID19**
- More than **100** media placements
- Over **556,474,545** media impressions

ashrae.org/COVID19

COVID-19 Preparedness Resources

- Buildings and Schools Reopening Guidance
- FAQs
- Free ASHRAE Resources
 - ✓ ASHRAE training
 - ✓ Handbooks
 - ✓ Standards
 - ✓ Research papers
 - ✓ Seminars
 - ✓ Press coverage

ASHRAE BOD approved Statements, Position Document on
Infectious Aerosols
 Environmental Health Committee's Emerging Issue Brief
Pandemic COVID-19 & Airborne Transmission

ASHRAE CELEBRATING 125 YEARS

COVID-19 (CORONAVIRUS) PREPAREDNESS RESOURCES

ASHRAE | Resources from Others

Technical Committees | Training | Handbook | Standards | Conference and Journal Papers | Books | Science

SUBMIT YOUR FAQ

ASHRAE members and other subject matter experts researched and provided responses to these frequently asked questions (FAQ), which were submitted by media and other members of the public. Have a question for the FAQ? Email us at COVID-19@ashrae.org

HEALTHCARE FAQ

HVAC SYSTEM OPERATION DURING BUILDING SHUTDOWN FAQ

HOW TO RETURN THE HVAC SYSTEM TO NORMAL OPERATION FAQ

GLOSSARY

ashrae.org/COVID19

ASHRAE New Global HQ



- Renovation kick-off Jan. 10, 2020
- Construction is on schedule
- Showcases a net-zero-energy ready building
- Demonstrates the latest HVAC&R equipment and technology
- Move expected by October 2020

**180 Technology Parkway
Peachtree Corners, GA**



Design team members were chosen based on an RFP, competitive bids and committee interviews.

The design team includes: **McLennan Design, Houser Walker Architecture and Integral Group.**

Project Management: **Darden Company** (formerly known as Collins Project Management)

Construction Manager at Risk: **Skanska**

Commissioning Agent: **Epsten Group**



For more information, visit:
ashrae.org/newhq

New HQ Building Campaign

THANK YOU!

Campaign to Date: May 2020

Total Raised: \$10.5M+

- All Cash and Pledges: \$6,471,700
- Gifts of Equipment & Services: \$4,043,088 (List Value)

Breakdown:

- Largest Gift: \$5,000,000 – NIBE
- ASHRAE Foundation: \$300,000
- Members: \$173,475
- Corporate Donors: 28 have participated!
- **\$3,000,000+ Still to Go!**
- Support of this Critical Project is Still Needed from Members and Industry Partners



**180 Technology Parkway
Peachtree Corners, GA**

**For more information, visit: ashrae.org/newhq
To donate, visit: ashrae.org/buildingcampaign**

New HQ Building Campaign



180 Technology Parkway
Peachtree Corners, GA

ASHRAE Members Rock!

- **ASHRAE Volunteers** have played an integral role:
 - Development Committee, Building Ad-Hoc Committee, Technical Advisory Subcommittee
- **Key Leadership** who have visited prospects with staff:
 - Darryl Boyce, Chuck Gulledge, Tom Phoenix, Dennis Knight, Ginger Scoggins, Don Brandt, Tim McGinn, Dennis Wessel, and Jeff Littleton

THANK YOU!

For more information, visit: ashrae.org/newhq
To donate, visit: ashrae.org/buildingcampaign

ASHRAE Resources

ASHRAE Technology Portal	Your one-stop location for ASHRAE papers, articles, reports, Handbook PDFs, and seminar recordings.	ashrae.org/technology-portal
Online Standards Database	Allows access to public review drafts for standards, guidelines, and addenda to submit comments, to do online balloting, and to submit proposals to standards and guidelines.	ashrae.org/publicreviews
Zero Energy Advanced Energy Design Guides	For offices and K-12 schools are available for free download. Multifamily AEDG available Summer 2020.	ashrae.org/freeaedg
Science and Technology For the Built Environment	Provides free online access to ASHRAE's archival research publication offering comprehensive reporting of original research.	ashrae.org/technical-resources/science-and-technology-for-the-built-environment
ASHRAE Technical Apps	Deliver mobile design, calculation, and analysis tools to the palm of your hand.	ashrae.org/technical-resources/technical-apps
ASHRAE's Free Resources	Offer downloads of a variety of well-known resources to everyone.	ashrae.org/technical-resources/free-resources

Selected Recent Publications

- Standards 62.1-2019, 62.2-2019, Standard 90.4-2019, and Standard 147-2019
- Guideline 41-2020, *Design, Installation and Commissioning of Variable Refrigerant Flow (VRF) Systems*
- *Smart Grid Application Guide: Integrating Facilities with the Electric Grid*
- *ASHRAE Position Document on Infectious Aerosols*
- *High-Performance Buildings Simplified*
- *Air-Conditioning System Design Manual*, 3rd ed.
- 125th Anniversary: *Proclaiming the Truth*, 2nd ed.; *Adventures in Heat & Cold*
- *Damp Buildings, Human Health, and HVAC Design* (MTG report)
- *ASHRAE Position Document on Energy Efficiency in Buildings*
- Guideline 12-2020, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*



[ashrae.org/bookstore](https://www.ashrae.org/bookstore)

Upcoming Publications

Spring 2020

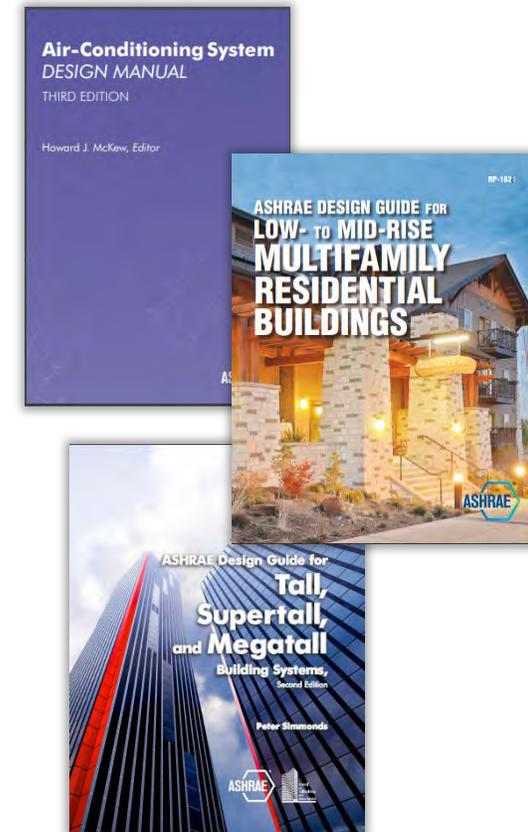
- *ASHRAE Design Guide for Low- to Mid-Rise Multifamily Residential Buildings*
- *ASHRAE Design Guide for Tall, Supertall, and Megatall Building Systems, 2nd ed.*

Summer 2020

- *20th Century Air Conditioning*
- *HVAC Fast Facts I-P*
- *Advanced Energy Design Guide for Multifamily Buildings: Achieving Zero Energy*
- Spanish translation: *ASHRAE Design Guide for DOAS*
- *A Practitioner's Guide to Engineering Management*

Fall 2020

- *Designing for Operational Excellence*
- *Duct Systems Design Guide*
- *ASHRAE Guide for Hazardous Spaces*
- *Design Guide for Combustion Turbine Inlet Air Cooling Systems, 2nd ed.*
- *ASHRAE/REHVA Guidebook Towards Zero Energy Hospital Buildings*
- *ASHRAE Design Guide for Natural Ventilation*



ASHRAE Learning Institute (ALI)

New & Updated Courses offered in the 2020 Online Course Series

- Air-to-Air Energy Recovery Applications: Best Practices
- Designing and Operating High-Performing Healthcare HVAC Systems
- Designing for Cold Climates
- Guideline 36: Best in Class HVAC Control Sequences
- Laboratory Exhaust Stacks: Safe and Energy-Efficient Design
- Principles of Building Commissioning: ASHRAE Guideline 0 and Standard 202
- Reducing Infectious Disease Transmission with UVGI (*1 hr*)
- Save 40% by Complying with Standard 90.1-2019
- V in HVAC – What, Why, Where, How, and How Much

ashrae.org/education

ASHRAE Certification

NEW! Digital Badging

- Embedded metadata uniquely linked to certificants
- Shareable in electronic media, including LinkedIn
- Over 7,000 badge views

NEW! Certified HVAC Designer (CHD) Study Guide Launching July 2020

COMING SOON! Remotely Proctored Examination

- Conveniently sit for an exam from your home or office
- Live remote proctor with secure, lock-down browser

Available summer 2020!



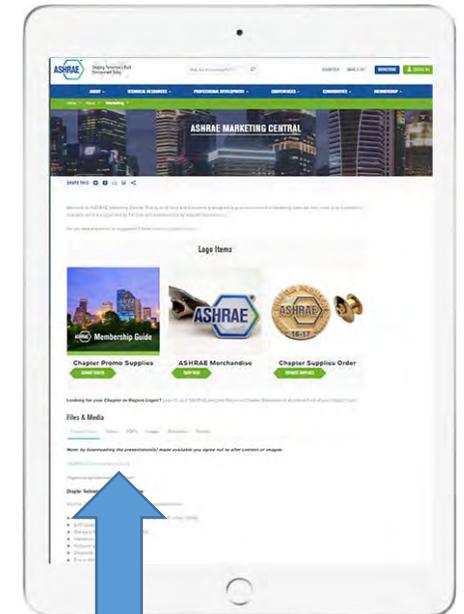
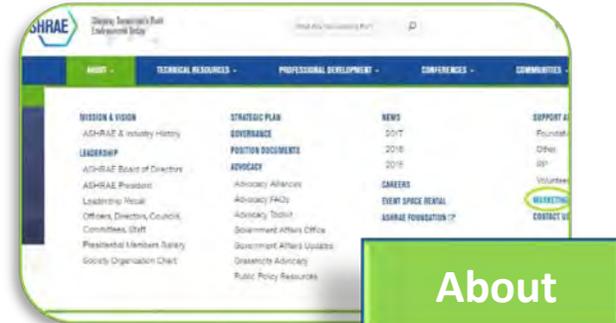
ashrae.org/certification

Marketing Central

Resources for Society-related marketing materials

- PowerPoint Presentations
- Videos
- PDFs
- Images
- Templates
- Toolkits
- Websites & Forms
- News & Events
- Grassroots
- Going to a show? Order a pull-up banner or table top sign with your Chapter logo!

How to find Marketing Central:



ashrae.org/marketing

ASHRAE 365

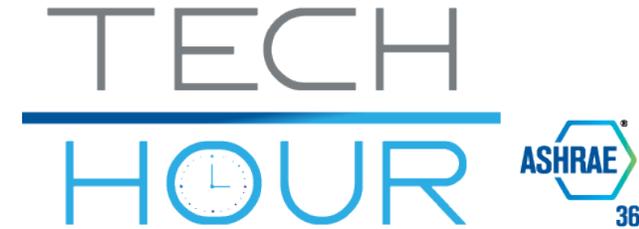
Over **19,000** active downloads!



- ASHRAE Events & Topical Conferences
- Professional Development Resources
- Volunteer and Member Resources

Download it free today!

ashrae.org/365



Over **9,000** views for both Tech Hours combined!

Tech Hour introduces the latest technical content presented by some of ASHRAE's brightest minds. Tech Hour videos are one hour and conveniently available in **ASHRAE 365** or on **ashrae.org**.

- Participants may be eligible to receive one PDH
- New videos published quarterly
 - ✓ Tech Hour #1: **Optimize Occupant Health, Building Energy Performance and Revenue through Indoor-Air Hydration**
 - ✓ Tech Hour #2 : **Where Have All the Ethics Gone?**
 - ✓ Tech Hour #3 : TBD Summer 2020

ashrae.org/techhour



Virtual Conference Feedback

**Members and committees are encouraged to share
Virtual Conference feedback with their ExO.**



What was good?
What could have been better?

Questions?

Thank You!

ATTACHMENT E



ashrae.org

ASHRAE[®]
CELEBRATING
125
YEARS

Epidemic Task Force

Report to the ASHRAE Board of Directors

Motions: None

Information:

The Epidemic Task Force was established the first week of March 2020.

Formed to deploy ASHRAE's technical resources to address current pandemic and future epidemics:

- HVAC System Operation During Building Shutdown
- How to Return the HVAC System to Normal Operation
- Operating of Heating/Cooling System in Home
- Riding Mass Transit and Airlines
- Upgrading filters and use of air cleaners
- Healthcare Facilities, Commercial, Residential, Schools and Universities, Residential, Transportation
- Air conditioning and heating
- Ventilation Systems
- Exhaust Systems
- Filtration and Disinfection
- BAS and Access Control Systems
- Elevator Control
- Water Systems

ETF Objectives:

- Response to COVID-19 pandemic
 - Short term
- Reopening/2nd wave
- Plan for the Future
- Lessons learned
- Research
- Standards and guidance
- Enhanced focus on resilience

Structure

- 17 core members, including staff liaison and three staff directors
- Interdisciplinary: experts in engineering, building operations, medicine and public health
- Steering committee for teams focused on specific areas ~120 team members
- Coordinate with ASHRAE technical and standards committees, other organizations
- Weekly meetings of task force, most teams have weekly meetings

General Information:

Dedicated website: [COVID-19 \(Coronavirus\) Preparedness Resources](#)

Updated Position Document approved and posted on Infectious Aerosols

New Emerging Issues Brief on COVID-19 Airborne Transmission

10 plus new documents addressing over 350 pages of guidance created by the teams and posted to the website

Have answered over 500 specific questions submitted to the RTF through the covid-19@ashrae.org email address

Participated in more than 43 media events and interview requests including publications such as The Wall Street Journal, Bloomberg and Fast Company

Over 100 of the latest papers reviewed and summarized and included under our scientific heading of the website.

Liaisons participated in the AIA's COVID-19 task force and assisted the AIA with developing their building assessment tool and tier re-opening guidance

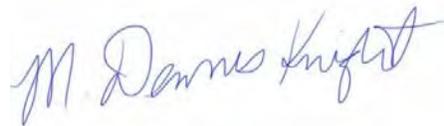
The following courses have been offered or are coming up soon:

REGS	DATE	COURSE	INSTRUCTORS
250	7-Apr	Designing and Operating High-Performing Healthcare HVAC Systems	Dan Koenigshofer
120	11-Jun	Introduction to Ultraviolet Germicidal Irradiation (UVGI) Systems	Bill Bahnfleth
37	18-Jun	Hospital HVAC: Infection Mitigation, Comfort, Performance	Dan Koenigshofer
3,260	21-Apr	(Free) Reducing Infectious Disease Transmission with UVGI	Bill Bahnfleth
1,751	16-Jun	(Free) Re-Opening Our Schools: Activities and Recommendations	Raj Setty
1,272	29-Jun	(Free) Managing Your HVAC Systems to Help Mitigate the Spread of SARS-CoV-2 in Buildings	Wade Conlan, Dennis Knight, Sarah Maston
706	21-Jul	(Free) Analysis of Airflow Patterns and Flow Path of Airborne Contaminants	Kishor Khankari

287,000 unique hits to the website with dwell times of approximately 5 minutes per visit.

Nearly 600 million media impressions!!!!!!

Thanks to the Members & Staff – See Attached



Submitted By: M. Dennis Knight, P.E., FASHRAE

June 23, 2020



ASHRAE Position Document on Indoor Air Quality

Approved by ASHRAE Board of Directors
Month Day, 20XX

Expires
Month Day, 20XX

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COMMITTEE ROSTER

The ASHRAE Position Document on Indoor Air Quality was developed by ASHRAE's Indoor Air Position Document Committee formed on January 26, 2018, with Donald Weekes Jr. as its chair.

Donald Weekes Jr. (Chair)
In Air Environmental Ltd.
Ottawa, ON Canada

Brent Stephens
Illinois Institute of Technology
Chicago, IL USA

John P Lapotaire
Indoor Air Quality Solutions LLC
Winter Springs, FL, USA

Iain Walker
Lawrence Berkeley Laboratory
Berkeley, CA USA

Andrew Persily
NIST
Gaithersburg, MD USA

Pawel Wargocki
Technical University of Denmark
Kongens Lyngby, Denmark

Jeffrey Siegel
University of Toronto
Toronto, ON Canada

Bruce White
SGS Forensic Laboratories
Fountain Valley, CA USA

Cognizant Committee

The chairperson of the ASHRAE Environmental Health Committee, also served as an ex-officio member:

Wade Conlan
Hanson Professional Services
Maitland, FL, USA

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HISTORY OF REVISION/REAFFIRMATION/WITHDRAWAL DATES

The following summarizes this document's revision, reaffirmation, or withdrawal dates:

1989 – BOD approves Position Document titled Indoor Air Quality

6/28/2001 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

2/10/2005 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

7/21/2011 – BOD approves revision to Position Document titled Indoor Air Quality

7/2/2014 – Technology Council reaffirms Position Document titled Indoor Air Quality

6/28/2017 – Technology Council reaffirms Position Document titled Indoor Air Quality

X/XX/20XX – BOD approved revision to Position Document titled Indoor Air Quality

Note: ASHRAE's Technology Council and the cognizant committee recommend revision, reaffirmation, or withdrawal every 30 months.

Note: ASHRAE position documents are approved by the Board of Directors and express the views of the Society on a specific issue. The purpose of these documents is to provide objective, authoritative background information to persons interested in issues within ASHRAE's expertise, particularly in areas where such information will be helpful in drafting sound public policy. A related purpose is also to serve as an educational tool clarifying ASHRAE's position for its members and professionals, in general, advancing the arts and sciences of HVAC&R.

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ABSTRACT

It is ASHRAE's position that provision of **good-acceptable** IAQ is an essential building service and that all decisions about buildings and heating, ventilating, and air-conditioning (HVAC) systems must consider the implications for IAQ. This position holds for all building types, including sustainable and resilient buildings where measures have been taken to reduce environmental impacts and energy use.

Formatted: Highlight

ASHRAE recommends further research on the impact of IAQ on people's health, comfort, well-being, learning **outcomes** and **work** performance, and continued development of the technologies needed to address IAQ in all types of buildings.

Commented [SH1]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature. All usages of the term were used and replaced throughout.

Commented [LL2]: Sleep performance not important?

ASHRAE is committed to maintain and update IAQ standards and guidelines and to use its leadership position to promote research, education, and best practices in IAQ.

Commented [SH3R2]: PDC left as is. Sleep is part of well-being which could bring in other aspects such as exercise, etc. not listed here.

The appendix of this document provides evidence to support these positions, including the effects of IAQ on human health, comfort, well-being, learning **outcomes** and **work** performance, and the economic benefits of improved IAQ.

Commented [SH4]: PDC felt 'work' should be kept. "Work performance". These are terms used in literature of evidence used to make these recommendations

Commented [SH5]: See earlier comment on 'learning outcomes'

Commented [SH6]: See earlier comment on work and work performance

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EXECUTIVE SUMMARY

Indoor air quality (IAQ) has long been a critical issue for ASHRAE and its members because of the connection to ventilation and other HVAC systems in buildings. ASHRAE's Standards 62.1 (commercial and institutional buildings) and 62.2 (residential buildings) intended to support acceptable IAQ have been the benchmarks for ASHRAE's members and others involved with IAQ (e.g., practitioners; contractors; industrial hygienists) since 1973. ASHRAE has been concerned with all aspects of IAQ through its Position Documents, other standards and guidelines, conferences, and other efforts.

ASHRAE's positions are that:

- IAQ impacts people's health, comfort, well-being, learning outcomes and work performance. Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
- The provision of acceptable IAQ is an essential building service and central to ASHRAE's purpose.
- Achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including efforts to improve building energy efficiency, sustainability and resiliency.
- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation should be included in educational programs.
- ASHRAE's IAQ standards should be adopted by building codes and regulations.

Commented [BWP7]: Should Std. 170 be mentioned? It is in the body of the PD.

Commented [SH8R7]: PDC decided not to include here. Concern is not less on special environments here in exec summary.

Commented [MHS9]: Does ASHRAE have 2nd class positions? All the positions should be listed here.

Commented [SH10R9]: These are copied from positions listed later in PD to comply with ASHRAE PD template.

Please refer to review comments below for discussion on changes

Commented [SH11]: See earlier comment on 'learning outcomes'

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1. THE ISSUE

Indoor air is a the dominant pathway for exposure to airborne contaminants given that people spend the majority of their time indoors, and indoor air commonly contains numerous contaminants originating from both indoor and outdoor sources. Many of the contaminants impact health, comfort, well-being, learning outcomes and work performance. It is important that IAQ is considered in the design, construction and operation of buildings and HVAC systems. ASHRAE and its partners have long pursued improved IAQ through a range of activities.

2. BACKGROUND

This document contains a high level discussion of indoor air quality given that ASHRAE has published many informative documents related to indoor air quality such as the Handbook - Previous versions of this position document went into great technical detail on a broad range of IAQ issues. These details are not included in this document because that information is now well covered in other ASHRAE publications such as the Handbook - Fundamentals (particularly Chapters 9 through 12) and two IAQ guides:

“Indoor Air Quality Guide – Best Practices for Design, Construction and Commissioning” and “Residential Indoor Air Quality Guide: Best Practices for acquisition, design, construction, maintenance and operation”.

Additionally, many other important IAQ issues are not covered here, as there are separate Position Documents that cover specific topics including: Airborne Infectious Aerosols Diseases, Environmental Tobacco Smoke, Unvented Combustion Devices and IAQ, Filtration and Air Cleaning, and Limiting Indoor Mold and Dampness in Buildings. Instead, this document focuses on recommendations in several broad areas including policy, research, and education related to IAQ.

2.1 Overview

An established and still growing body of literature, summarized in the Appendix of this document, has demonstrated that: (1) IAQ impacts occupant health, comfort, well-being and the ability to work and learn, and therefore, (2) improving IAQ will bring benefits at the societal and individual levels.

Indoor air quality (IAQ) refers to the types and concentrations of airborne contaminants found in buildings. And while there is no universally accepted definition of “good” IAQ, there are three widely accepted approaches to improving IAQ in buildings:

- **Source control**

- Use building materials, furnishings, appliances, and consumer products with low contaminant emissions;
- Minimize indoor contaminant sources caused by occupant activities;
- Remove outdoor contaminants via filtration and air cleaning before they enter a building; and

Commented [MHS12]: Only one thing can dominate

Commented [SH13R12]: PDC made change suggested by MS

Commented [EJS14]: ASHRAE 62.1 has steered away from the use of “contaminants” when referring to sources. Not all emissions from indoor or outdoor air are harmful or unnatural. “Contaminant” denotes a substance that would not ordinarily be present or that is somehow harmful.

Commented [SH15R14]: PDC noted they’ve discussed before and confirmed to go with contaminants. This is OK and PD committee did not like any other terms better here

Commented [SH16]: See earlier comment on ‘learning outcomes’

Commented [SH17]: PDC felt ‘work’ should be kept. “Work performance”. These are terms used in literature of evidence used to make these recommendations

Commented [BWP18]: I don’t think this explanation is needed, but the reference to sources of more detailed information is fine.

Commented [HS19R18]: PDC agreed to changes as shown

Commented [EJS20]: change

Commented [SH21R20]: PDC made change.

Commented [HE22]: “Infectious Aerosols”

Commented [SH23R22]: PDC made change.

Commented [LL24]: Maybe “Elements”? Child grow up with more germs can have stronger immune system; Diversity of microbe maybe important for healthier air (see below). Do we know enough to narrow study those elements as only “contaminants”? <https://www.ncbi.nlm.nih.gov/books/NBK458819/>

Commented [SH25R24]: PDC – Felt contaminants was best choice of word here.

Commented [HE26]: Unclear – “Remove contaminants from outdoor air being brought into the building”

Commented [SH27R26]: PDC agreed to change as shown.

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- Design, operate, and maintain building enclosures, HVAC systems, and plumbing systems to reduce the likelihood of moisture problems and/or quickly mitigate them when they happen.
- **Ventilation**
 - Ensure that clean ~~outdoor~~ air is delivered to occupied spaces in order to effectively dilute and remove contaminants emitted by indoor sources and that air is exhausted in the vicinity of localized indoor sources.
- **Air cleaning**
 - Use effective air cleaning technologies to remove contaminants from outdoor ventilation air and recirculated indoor air.

Commented [MHS28]: The ASHRAE definition of ventilation does not require the air be outdoor—whatever that means. It requires that it be clean and suitable for dilution of indoor contaminants.

Commented [SH29R28]: PDC agreed and deleted outdoor

Cost-benefit analyses have estimated that the health and economic benefits of improved IAQ are far greater than the costs of implementing these improvements. Also, many strategies exist, and others continue to emerge, that can help achieve good IAQ with lower energy impacts. Ultimately, an integrated design approach that considers both IAQ and energy, in addition to other key aspects of building performance such as site impacts, water use and other environmental impacts, is required to achieve high performing buildings that are energy efficient and achieve good IAQ. For more information on integrated design in context of IAQ see the ASHRAE IAQ Design Guide.

2.2 ASHRAE Activities in Support of IAQ

ASHRAE ~~promotes good better~~ IAQ by ~~providing~~ provides technical resources, ~~coordinating coordinates~~ and ~~funding funds~~ research, ~~organizing organizes~~ conferences, and ~~educating educates~~ practitioners ~~about IAQ~~. ASHRAE has also developed and continues to support standards, guidelines, and other resources related to improving IAQ. For example, ASHRAE promulgates the following ~~minimum~~ standards that specifically address IAQ:

- ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*. This Standard, first published in 1973, establishes ~~minimum~~ ventilation and other IAQ related requirements for buildings other than residential and health care. Its outdoor air ventilation rate requirements have been adopted into the International Mechanical Code and Uniform Mechanical Code, the two most common model building codes in the US. The standard is also referenced by most green building programs including LEED.
- ANSI/ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. This Standard, first published in 2003, covers residential buildings. ~~Minimum V~~ ventilation requirements from this standard have been adopted into codes, including California's Title 24, and into LEED for Homes and the U.S. Environmental Protection Agency's (EPA) Indoor airPlus program.
- ANSI/ASHRAE/ASHE Standard 170, *Ventilation of Health Care Facilities*. Standard 170 brought together several documents used throughout North America into a single standard. It is now widely used in building codes for ventilation requirements in hospitals and other health care facilities.
- ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1, *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings*. Developed in conjunction with USBGC, the International Code Council and Illuminating

Commented [MHS30]: Not all these standards are for good IAQ. The 62s in particular targeted on **acceptable** IAQ not **good** IAQ as the lead to this paragraph implies.

Commented [SH31R30]: PDC – agreed to changes to 1st sentence as shown

Commented [MHS32]: It is important to note that these standards are minimum standards.

Commented [SH33R32]: PDC removed 'minimum' here and added to 62.1 & 62.2 below.

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Engineering Society (IES), this standard provides IAQ requirements beyond those in Standard 62.1. The standard was developed to be adopted as part of voluntary green/sustainable rating systems, green building incentive programs, and local building regulations. The most recent version of the standard (2017) serves as the technical content of the 2018 International Green Construction Code.

In addition, ASHRAE has published a number of guidelines and design guides help practitioners achieve good IAQ in buildings, including:

- ~~ASHRAE Guideline 24, Ventilation and Indoor Air Quality in Low-Rise Residential Buildings. This Guideline is a companion document to standard 62.2 that expands beyond the standard's minimum requirements to discuss best practices and system design.~~
- ASHRAE *Indoor Air Quality Guide – Best Practices for Design, Construction, and Commissioning*. This Guide, resulting from a collaborative effort of six leading organizations in the building community, presents best practices for design, construction, and commissioning that have proven successful in other building projects. It provides information and tools that architects and design engineers can use to achieve an IAQ-sensitive building that integrates IAQ into the design and construction process along with other design goals, budget constraints, and functional requirements.
- ASHRAE *Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation* addresses IAQ issues in residential buildings.
- ~~The ASHRAE Epidemic Task Force has recently published guidance initiated by the COVID19 pandemic, which can be found at <http://www.ashrae.org/covid19>~~

A more complete list of standards, guidelines, and other relevant ASHRAE publications is included in the Appendix of this document.

3. RECOMMENDATIONS

- ASHRAE holds the following positions: ~~(PDC suggested keeping as listed, not all bullets in exec summary)~~
 - ~~Good~~ IAQ is essential for impacts people's health, comfort, well-being, learning outcomes ability and work performance. ~~It~~ Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
 - The provision of acceptable ~~good~~ IAQ is ~~thereby~~ an essential building service and central to ASHRAE's purpose.
 - Achieving and maintaining ~~good~~ IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including

Commented [SH34]: PDC had question on if this was withdrawn.

From Mark Weber: 'SRS approved the withdrawal public review. Has to get approved by StdsC on June 26th first.'

Still in bookstore and not on website list of withdrawn standards.

Commented [MHS35]: While the PDC did not consult this in the development of the PD, it should be included here. As it is a good and timely resource

Commented [SH36R35]: PDC agreed but will listed in the Appendix as it is a bit difference in nature than the other references listed here.

Commented [BWP37]: This appears to be a note that should be deleted.

Commented [SH38R37]: PDC – yes. Deleted.

Commented [EJS39]: Is the PDC expectation that this more detailed expansion of the two summary bullets be deleted? Perhaps this could be reordered so that each of these bullets fall under one or the other of the two in the Executive Summary.

Commented [SH40R39]: PDC – this was mistakenly left it. Deleted now. Intent is now to list positions here and co

Commented [MHS41]: This is a key problem. It cannot be ASHRAE's position that Good IAQ is essential.

Commented [SH42R41]: PDC - Delete 'good' change to 'IAQ impacts'..

Commented [SH43]: See earlier comment on 'learning outcomes'

Commented [HS44]: BOD member Andres Sepulveda

Commented [SH45R44]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in

Commented [SH46]: PDC felt 'work' should be kept. "Work performance".

Commented [HS47]: Sepulveda comment Suggested "productivity" vs. work performance

Commented [SH48R47]: PDC – prefers work performance as a common term in much of referenced

Commented [SH49]: PDC agreed to replace 'good' with 'acceptable'

Commented [MHS50]: This sentence is a key and separate thought; it surely deserves its own bullet.

Commented [SH51R50]: PDC - deleted

Commented [LL52]: Max's comment?

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efforts to improve building energy efficiency, sustainability and resiliency.

- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation shall ~~should~~ be included in educational programs.
- ASHRAE's IAQ standards should be adopted by ~~national and local~~ building codes and regulations.
- ASHRAE recommends fundamental and applied IAQ ~~research~~ and standards development in the following areas:
 - The relationship of ventilation rates and contaminant concentrations to occupant health, comfort, well-being, learning ~~outcomes~~ and ~~work~~ performance.
 - Approaches to improving IAQ beyond dilution ventilation, e.g., air cleaning and ~~contaminant's~~ source control.
 - Development of tools to allow economic valuation of IAQ benefits for individual buildings and groups of buildings.
 - Development of monitoring and HVAC equipment to control IAQ by measurement of ~~contaminant's concentration~~.
 - Development of ~~diagnostics diagnostic tools for~~ commissioning and maintenance of ventilation and related IAQ systems.
 - The role of IAQ in building sustainability and resilience.
 - Development of IAQ control systems and solutions that contribute to other building goals including reducing energy use and greenhouse gas emissions and supporting grid integration.
 - Research on new contaminants of concern and development of technologies and approaches to address them.
- ASHRAE is committed to:
 - Maintaining and updating IAQ standards, guidelines and handbooks;
 - Integrating principles of IAQ within its professional education programs
 - ~~Development Advancement~~ of IAQ ~~research including~~ tools and applications;
 - Using its leadership position to develop partnerships with international organizations to promote research, education, and best practices in IAQ.

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Commented [MH555]: Typo I assume. "Shall" is not appropriate for a recommendation

Commented [SH56R55]: PDC – yes, agreed to change

Commented [MH557]: Not international or regional or contractual? Why specify at all?

Commented [SH58R57]: PDC – agreed to change

Commented [MH559]: We are recommending other people do research in this area but we are not committed to doing it ourselves? Something is out of scale here

Commented [SH60R59]: PDC – no change here, suggestion to list ASHRAE's commitment to research added below

Commented [SH61]: See earlier comment on 'learning outcomes'

Commented [LL62]: Sleeping performance not important?work

Commented [SH63R62]: KPDC left as is. Sleep is part of well-being which could bring in other aspects such as exercise, etc. not listed here.

Commented [HS64]: Sepulveda comment

Commented [SH65R64]: PDC – prefers current language

Commented [HS66]: BOD member Andres Sepulveda

Commented [SH67R66]: PDC – could be more than concentrations – dose, quantity, etc.

Commented [HS68]: Sepulveda comment

Commented [SH69R68]: PDC – preferred current language to general terms vs. diagnostic tools, diagnostic procedures, etc.

Commented [SH70]: PDC approved MS suggestions here

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4. REFERENCES

(editors to list references cited in PD here)

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A. APPENDIX

This appendix summarizes the relevant literature supporting ASHRAE's IAQ Position Document and provides additional context for the positions and recommendations contained in that document.

A.1 What is indoor air quality?

For the purposes of this document, indoor air quality (IAQ) refers to the types and concentrations of contaminants in indoor air that are known or suspected to affect people's comfort, well-being, health, learning **outcomes** and **work** performance. Primary classes of these contaminants include particulate matter (both biological, including **allergens**, potential pathogens, and non-biological), organic gases (e.g., volatile and semi-volatile organic compounds), and inorganic gases (e.g., carbon monoxide, ozone, and nitrogen oxides). Other factors contributing to IAQ include water vapor and odors. Indoor concentrations of contaminants are influenced by outdoor concentrations, ventilation and infiltration, indoor emissions, and a number of other contaminant-specific source and sink mechanisms (e.g., deposition, chemical reactions, and air cleaning).

IAQ impacts humans by exposure to pollutants by inhalation, dermal and ingestion pathways. Personal and indoor exposures to many airborne contaminants are commonly higher than outdoor exposures (e.g., Meng et al., 2009; Morawska et al., 2013; Sexton et al., 2004; Wallace, 2000; Wallace et al., 1991, 1985), and the majority of human exposure to outdoor contaminants also typically occurs indoors (e.g., Asikainen et al., 2016; Azimi and Stephens, 2018; Chen et al., 2012, 2012; Logue et al., 2012; Weschler, 2006). These elevated exposures arise because of the large amount of time that people spend indoors (Klepeis et al., 2001) and because concentrations of many contaminants are higher indoors than outdoors (e.g., Abt et al., 2000; Adgate et al., 2004; Meng et al., 2005; Rodes et al., 2010; Wallace et al., 1991; Zhang et al., 1994).

While this appendix does not address hygrothermal conditions, the recommendations in the position document recognize the effects of temperature and moisture levels on IAQ through changes in contaminant emission rates, the growth of microorganisms on building surfaces, the survival of infectious pathogens in air and on surfaces, the survival of house dust mites (a source of allergens), people's perception of the quality of indoor air, and ultimately, the effects of moisture and moisture associated problems (e.g. mold, fungi or house dust mite) on the prevalence of building related symptoms.

A.2 How does IAQ impact health, comfort, well-being, learning **outcomes** and **work** performance?

IAQ impacts occupant health, comfort, well-being, learning **outcomes** and **work** performance (Jones, 1999; Spengler and Sexton, 1983; Sundell, 2004). There is a small but growing body of epidemiology literature that has specifically linked indoor

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contaminant exposures or sources to various adverse health outcomes, including but not limited to: combustion appliances (e.g., gas stoves) and respiratory illness in children (e.g., Garrett et al., 1998; Kile et al., 2014; Lanphear et al., 2001; Melia et al., 1977); VOCs and childhood asthma (e.g., Rumchev, 2004); chemical household products and respiratory symptoms in children (e.g., Sherriff, 2005) and asthma in adults (e.g., Zock et al., 2007); phthalates and asthma and allergy symptoms in children (e.g., Bornehag et al., 2004; Jaakkola and Knight, 2008; Kolarik et al., 2008); pet allergens and childhood asthma (e.g., Lanphear et al., 2001); radon exposure and lung cancer (Samet, 1989); airborne-transmitted infectious diseases such as pulmonary tuberculosis (TB) (Burrell, 1991), severe acute respiratory syndrome (SARS) (Li et al., 2007), [COVID-19 \(ASHRAE, 2020\)](#) and the common cold (Myatt et al., 2004); and carbon monoxide (CO) poisoning (Ernst and Zibrak, 1998); among others.

Some attempts have been made to quantify the burden of health effects associated with chronic (i.e., long-term) exposure to contaminants in indoor air. For example, Logue et al. (2011) and Logue et al. (2012) estimated the health impacts of long-term exposure to contaminants commonly found in U.S. homes using Disability Adjusted Life Years (DALYs) to establish a hierarchy of contaminants of concern. Similarly, Asikainen et al. (2016) estimated the annual disease burden caused by exposure to air pollutants in residential buildings in the European Union to be approximately 2.1 million DALYs per year, driven primarily by exposure to fine particulate matter (diameter $\leq 2.5 \mu\text{m}$; $\text{PM}_{2.5}$) originating from outdoor sources, followed by $\text{PM}_{2.5}$ from indoor sources.

Additionally, excessive dampness or moisture in buildings is associated with a range of problems including mold, dust mites and bacteria; and exposure to damp environments is associated with respiratory problems including asthma (e.g., Heseltine et al., 2009; IOM, 2004; Kanchongkittiphon et al., 2014; Mendell et al., 2011). Indoor contaminants can act as respiratory irritants, toxicants, and adjuvants or carriers of allergens (Bernstein et al., 2008) and can adversely affect human productivity (Wargocki et al., 1999) and cause odor problems. Recent evidence has also suggested that pollutants in indoor air may reduce cognitive function (Allen et al., 2016; Satish et al., 2012).

One of the most common health complaints is the occurrence of building-related symptoms including eye, nose, and throat irritation, difficulty in concentrating and thinking clearly, headaches, fatigue and lethargy, upper respiratory symptoms, and skin irritation and rashes, as well as overall poor well-being (e.g., Bluysen et al., 1996; Mendell, 1993; Mendell and Smith, 1990; World Health Organization, 1983). The term "sick building syndrome" ("SBS") has been used to describe the excess prevalence of these symptoms, without attribution to specific pathogens or illnesses or building characteristics, and is viewed as more informative than building-related symptoms (Redlich et al., 1997). The term "building-related illness" refers to diseases including hypersensitivity pneumonitis and Legionnaires' disease, which are associated with specific exposures to pathogens and other contaminants in a building (Bardana et al., 1988).

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A.3 What are effective ways to improve IAQ?

The foremost approach to improving IAQ is source control both indoors and outdoors (Carrer et al., 2018; Nazaroff, 2013). Reducing or minimizing indoor contaminant sources can be achieved through selection of construction materials, furnishings, and maintenance products with low emission rates, restricting occupant use of fragranced or scented products (Steinemann et al., 2011), and minimizing the emissions from human activities for example by installing “walk-off” mats (Farfel et al., 2001; Layton and Beamer, 2009). Another form of source control is local exhaust ventilation, which removes contaminants before they have the opportunity to mix within occupied spaces, such as for residential cooker/range hoods (Delp and Singer, 2012; Lunden et al., 2015), and wet spaces, e.g., bathrooms and laundry rooms.

One element of source control is to keep buildings dry, for example by minimizing indoor sources of water vapor through source control and the control of moisture using humidifiers and dehumidifiers, as well as by designing and constructing building enclosures and HVAC systems to limit moisture problems (ASHRAE, 2018a, 2009; Heseltine et al., 2009). Episodic water events that invariably happen (e.g., floods, leaks, etc.) must be managed rapidly and effectively to prevent water damage and sustained dampness.

After effective source control, ventilation is used to dilute indoor contaminants with clean outdoor air. Literature reviews show that increasing ventilation rates led to improved health outcomes (e.g., Carrer et al., 2015; Sundell et al., 2011). Using ventilation to improve IAQ should also include minimizing the entry of contaminants from outdoors in polluted ambient environments (e.g., Liu and Nazaroff, 2001; Singer et al., 2016; Stephens et al., 2012; Stephens and Siegel, 2012; Walker and Sherman, 2013), (for example by reducing enclosure leakage or effectively filtering the outdoor air supply).

The third strategy, after source control and ventilation, is to clean indoor air via particle filtration and gaseous air cleaning. The ASHRAE Position Document on Filtration and Air Cleaning (ASHRAE, 2018b) and the U.S. Environmental Protection Agency's Guide to Air Cleaners in the Home (US EPA, 2018) both address many important issues related to filtration and air cleaning, as do recent literature reviews (e.g., Fisk, 2013; Zhang et al., 2011). For example, particle filters have been shown to reduce indoor concentrations of airborne particles and some empirical evidence shows that their use can have positive impacts on health. Some sorbent air cleaners have been shown to effectively reduce concentrations of gaseous contaminants, albeit with minimal empirical data on their impacts on health.

The complex relationship between IAQ and external environmental conditions, coupled with the effects of climate change, necessitates a shift towards designing and operating buildings that are not only comfortable and healthy for the occupants but are also sustainable. It is generally believed that achieving good IAQ can only result with increased energy consumption. However, many strategies exist that can both secure high IAQ and reduce energy use, including increased envelope airtightness, heat

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recovery ventilation, demand controlled ventilation, and improved system maintenance (Persily and Emmerich, 2012). Additionally, more dynamic ventilation strategies are being developed that allow time shifting and other variable ventilation strategies such as smart ventilation (e.g., Rackes and Waring, 2014; Sherman et al., 2012; Sherman and Walker, 2011).

A.4 What are the economic costs and benefits of improving IAQ?

Socio-economic costs of air pollution can be substantial (Asikainen et al., 2016; Boulanger et al., 2017; Jantunen et al., 2011). Providing improved IAQ is estimated to have substantial economic benefits (e.g., Aldred et al., 2016a, 2016b; Bekö et al., 2008; Brown et al., 2014; Chan et al., 2016; Fisk et al., 2012, 2011; Fisk and Chan, 2017; MacIntosh et al., 2010; Montgomery et al., 2015; Rackes et al., 2018; Zhao et al., 2015). The economic benefits accrue from having higher worker productivity (e.g., Allen et al., 2016; Wargocki and Wyon, 2017), improved learning (e.g., Haverinen-Shaughnessy et al., 2011; Wargocki and Wyon, 2013), lower absentee rates (e.g., Milton et al., 2000), and reduced healthcare costs. In workplaces, measures that result in only small improvements in performance or absence will often be cost effective because, in developed countries, employee costs (e.g. salaries, health benefits) far exceed the costs of maintaining good IAQ (Wargocki et al., 2006; Woods, 1989). Additional economic benefits are possible through reduced maintenance costs and avoidance of IAQ investigations and remediation measures by designing, constructing, and operating buildings in a manner that reduces the likelihood of serious IAQ problems, such as widespread dampness and mold.

Several studies that have estimated the costs and benefits of improved source control, ventilation, and air-cleaning technologies are summarized below:

Source Control: Wargocki and Djukanovic (2005) estimated the costs associated with improving IAQ by reducing the load of pollution sources in a hypothetical building. The additional investments in energy, HVAC first costs and maintenance costs, and building construction costs were highly cost effective, with payback times below 2-two years and an estimated return on investment that was 4four to -7-seven times higher than the assumed interest rate of 3.2%. However, no specific analysis was conducted to estimate how much of these effects can be attributed to source control and how much to increased ventilation rates. Asikainen et al. (2016) estimated that a 25% reduction in indoor PM_{2.5} sources, a 50% reduction in indoor VOCs and dampness, and a 90% reduction in radon, carbon monoxide, and second hand smoke in residential buildings in the European Union could reduce the burden of disease associated with residential indoor air exposures by approximately 44%.

Ventilation: Fisk et al. (2011) estimated that the combined potential annual economic benefit of implementing a combination of IEQ improvements in U.S. offices (including increasing ventilation rates, adding outdoor air economizers, eliminating high indoor temperatures during winter, and reducing dampness and mold problems) is

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approximately \$20 billion per year. Similarly, Fisk et al. (2012) estimated that the economic benefits of increasing minimum ventilation rates in U.S. offices far exceed energy costs and that adding economizers would yield health, performance, and reduced absence benefits while saving energy. Dorgan et al. (1998) estimated the costs of improving ventilation in 40% of office buildings in the US considered unhealthy i.e. not meeting standard 62.1; the payback time of such activity was estimated to be below 1.4 years because of benefits for health and work performance resulting from it. Rackes et al. (2018) introduced an outcome-based ventilation framework for assessing performance, health, and energy impacts to inform ventilation rate decisions in U.S. office buildings and estimated that the economic benefits of increased ventilation rates in offices are routinely greater than additional energy costs or adverse health costs associated with introducing more outdoor contaminants through increased ventilation.

Filtration and air cleaning: Bekö et al. (2008) estimated that the health and productivity benefits of higher-performance filters would exceed their costs by well over a factor of 10 in an example office building. Montgomery et al. (2015) estimated benefit-to-cost ratios of up to 10 for improved filtration in office buildings in a variety of cities. Fisk and Chan (2017) similarly estimated benefit-to-cost ratios ranging from 3-three to 133 for the use of filters and/or portable air cleaners in both residences and commercial buildings. In all of the above studies, the avoided health care costs were the largest benefit of air cleaning. These and other studies on the costs and benefits of filtration and air cleaning were reviewed in Alavy and Siegel (2019).

Limited interview-based studies of decision-makers in the building industry in the U.S. have shown that they tend to underestimate the positive impacts of ventilation and filtration upgrades while overestimating costs (Hamilton et al., 2016). These findings suggest the need for educational activities to inform the industry on the costs and benefits of achieving good IAQ.

A.5 Summary

It is clear from the work cited in this appendix that IAQ in buildings is an essential building service that is vitally important to building occupants, owners, and designers, and therefore to ASHRAE. The health and economic impacts of IAQ are significant, and it is therefore essential to consider IAQ in all phases of building planning, design, and operation. Current design approaches and technologies include meeting minimum requirements (e.g., for ventilation as provided by ASHRAE Standards 62.1 and 62.2) and following guidelines for beyond-minimum performance (e.g., the ASHRAE IAQ design guides).

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Title

Indoor Air Quality

Purpose

The purpose of this position document is to inform the ASHRAE membership and the public of the importance of indoor air quality (IAQ)

Scope

1. Identify issues that affect the provision of high quality indoor air.
2. Summarize current state of knowledge including health, comfort, and productivity impacts of IAQ.
3. Discuss implementation of current knowledge through codes, standards and guidelines.
4. Recommend research needed.
5. Recommend needed education efforts and interaction with other relevant public and private organizations.

Title: ASHRAE Position Document on Infectious Aerosols

Purpose: Inform the ASHRAE membership and the public of the impact of HVAC systems on the distribution of infectious-aerosols. These aerosols can subsequently be inhaled directly in the upper respiratory tract, deep into the lung, or may settle out on surfaces and become indirectly transmitted by resuspension or fomite contact.

Scope:

The document will address the impact of HVAC systems that are described in the Systems Handbook on the distribution of infectious aerosols that results in exposure.

The document will address a variety of built and transportation environments.

The document will be written with sufficient scientific rigor and references to be useful to specialists such as policy makers, researchers, architects and engineers; and containing material that will be useful to the general public.

The document will provide the content from which a brief can be prepared for advocacy purposes.

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ABSTRACT

While indoor smoking has become less common in recent years, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts. ASHRAE's role in providing engineering technology, standards and design guidance in support of healthful and comfortable indoor environments supports the need for this position document.

ASHRAE's position is that all smoking activity inside and near buildings should be eliminated, which is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects. ASHRAE recommends that building design practitioners educate and inform their clients, where smoking is still permitted, of the limits of engineering controls of ETS exposure, that multifamily buildings have smoking bans inside and near them, and that further research be conducted on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs and electronic nicotine delivery devices (ENDS), and engaging in other activities commonly referred to as e-cigarettes or vaping.

DRAFT NOT FOR FURTHER DISTRIBUTION**EXECUTIVE SUMMARY**

While indoor smoking has become less common in recent years, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts. While ASHRAE does not conduct research on the health effects of indoor contaminants, ASHRAE has been involved in this topic for many years. Through its committees, standards, handbooks, guides, and conferences, ASHRAE has long been providing information to support healthful and comfortable indoor environments, including efforts to reduce indoor ETS exposure.

- ASHRAE is committed to encouraging lawmakers, policymakers and others who exercise control over buildings to eliminate smoking inside and near buildings.
- ASHRAE's current policy is that Standards and Guidelines shall not prescribe ventilation rates or claim to provide acceptable indoor air quality in smoking spaces. This PD recommends extending such policy to other ASHRAE documents.
- ASHRAE holds the position that the only means of avoiding health effects and eliminating indoor ETS exposure is to ban all smoking activity inside and near buildings. This position is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects and therefore,
 - The building and its systems can reduce only odor and discomfort but cannot eliminate exposure when smoking is allowed inside or near a building.
 - Even when all practical means of separation and isolation of smoking areas are employed, adverse health effects from exposure in non-smoking spaces in the same building cannot be eliminated.
 - Neither dilution ventilation, air distribution (e.g., "air curtains") nor air cleaning should be relied upon to control ETS exposure.
- ASHRAE recommends that building design practitioners work with their clients to define their intent, where smoking is still permitted, for addressing ETS exposure in their building and educate and inform their clients of the limits of engineering controls in regard to ETS.
- ASHRAE recommends that multifamily buildings have complete smoking bans inside and near them in order to protect nonsmoking adults and children.
- ASHRAE recommends, given current and developing trends, that further research be conducted by cognizant health authorities on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs, using ENDS, and engaging in other activities commonly referred to as vaping or using e-cigarettes.

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1. THE ISSUE

While indoor smoking has become less common in recent years in many countries¹, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts³⁸. Researchers have investigated the health and irritant effects among non-smokers exposed to tobacco smoke in indoor environments. Such exposure is also known as passive smoking and as involuntary exposure to secondhand smoke. A number of national and global health research groups and agencies^{1,2,9,13,16,20,23,28,29,34,37,38} have concluded, based on the preponderance of evidence, that exposure of nonsmokers to tobacco smoke causes specific diseases and other adverse effects to human health most significantly, cardiovascular disease and lung cancer. No cognizant authorities have identified an acceptable level of ETS exposure to non-smokers, nor is there any expectation that further research will identify such a level.

Despite extensive evidence of such harm, the well-documented benefits of bans, including exposure reduction and benefits to public health³⁶ and widening adoption of smoking bans, many locations worldwide still lack laws and policies that provide sufficient protection. In many locations, laws and policies are only partially protective, permitting smoking in certain building types including casino, entertainment and multifamily housing. Even where permitted by law, many developers, building owners, and operators, including those of restaurants and other hospitality venues, do not allow smoking indoors.

There are currently trends that increase use of electronic nicotine delivery systems (ENDS), smoking of cannabis, use of hookahs and other related activities that are beyond the scope of this document, but which likely present risks from involuntary exposure in the indoor environment that are not as well understood.

2. BACKGROUND

ASHRAE, through its Environmental Health Committee, TC 4.3 Ventilation Requirements and Infiltration, SSPCs 62.1 Ventilation for Acceptable Indoor Air Quality, 62.2 Ventilation and Acceptable Indoor Air Quality in Residential Buildings, 189.1 Standard for the Design of High-Performance Green Buildings, Handbook-Applications Chapter 46 and Handbook-Fundamentals Chapters 10 and 11, Indoor Air Quality Design Guides, and IAQ conferences, has long been active in providing engineering technology, standards and design guidance in support of providing healthful and comfortable indoor environments.

Previous versions of this position document have been instrumental in informing the public, building scientists and practitioners, policymakers and lawmakers about the inability of HVAC technologies to eliminate health risks to nonsmokers from exposure to tobacco smoke in indoor environments.

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The evidence on the health consequences of exposure to ETS is extensive (hundreds of scientific papers) and has been reviewed by numerous independent expert groups in the United States and internationally, all reaching similar conclusions regarding the adverse health effects caused among nonsmokers exposed to tobacco smoke indoors. These include but are not limited to:

U.S. Surgeon General^{9,38}

U.S. Environmental Protection Agency¹⁶

National Research Council¹³

California Environmental Protection Agency²⁰

National Toxicology Program²³

World Health Organization^{1,2,28}

International Agency for Research on Cancer (IARC)²⁹

United Kingdom Department of Health³⁴

The first major studies on passive smoking reported that passive smoking was a cause of lung cancer in non-smokers. Subsequent evidence has identified other health effects in adults and children. Notably, the number of coronary heart disease deaths caused by ETS greatly exceeds the number of ETS-caused lung cancer deaths. Additionally, the scientific evidence recognizes substantial subpopulations, such as children^{28,38} and adults with asthma or heart disease, whose disease may be exacerbated by ETS exposure.

There is no threshold for ETS exposure below which adverse health effects are not expected, as indicated in the referenced health authority reports. In general, risks tend to increase with the level of exposure and conversely to decrease with a reduction in exposure.

Only an indoor smoking ban, leading to near zero exposure, provides effective control, and only such bans have been recognized as effective by health authorities. Experience with such bans documents that they can be effective^{2,9,36,38}. While there are no engineering design issues related to this approach, the existence of outdoor smoking areas near the building and their potential impacts on entryway exposure and outdoor air intake need to be considered.

Nevertheless, smoking is permitted in some indoor spaces in some buildings. There are now several decades of international experience with the use of strategies, including separation of smokers and nonsmokers, ventilation, air cleaning and filtration, to limit contamination spread from smoking permitted areas to other areas inside the building.

There are three general cases of space-use and smoking activity in sequence from most to least effective in controlling ETS exposure:

- 1) allowing smoking only in isolated rooms;
- 2) allowing smoking in separate but not isolated spaces; and
- 3) totally mixing occupancy of smokers and nonsmokers.

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These approaches do not necessarily account for all circumstances. Each leads to different engineering approaches as follows.

1. Smoking Only in Isolated Rooms: Allowing smoking only in separate and isolated rooms, typically dedicated to smoking, can reduce ETS exposure in non-smoking spaces in the same building. Effective isolation requires
 - a) sealing of cross contamination pathways and airtightness of the physical barriers between the smoking and nonsmoking areas,
 - b) the use of separate ventilation systems serving the smoking and non-smoking spaces,
 - c) exhausting air containing ETS so it does not enter the non-smoking area through the outdoor air intakes, windows, and other airflow paths,
 - d) airflow and pressure control including location of supply outlets and return and exhaust air inlets to preserve airflow into the smoking space at doorways and other openings, which is powerful enough so that movement of people between non-smoking and smoking areas and so that thermal and other effects do not disrupt intended air distribution patterns.

Even when all available strategies have been employed in multifamily housing, there is a lack of credible evidence that anything short of a smoking ban will provide full protection to occupants of non-smoking residential dwelling units. The risk of adverse health effects for the occupants of the smoking room itself also cannot be controlled by ventilation.

2. Smoking in Separate but Not Isolated Spaces: This approach includes spaces where smokers and non-smokers are separated but still occupy a single space or a collection of smoking and non-smoking spaces not employing all the isolation techniques described in 2. a) through f) above. Examples can be found in restaurants and bars with smoking and non-smoking areas, or buildings where smoking is restricted to specific rooms, but a common, recirculating air handler serves both the smoking and non-smoking rooms.

Engineering techniques to reduce odor and irritation include, directional airflow patterns achieved through selective location of supply and exhaust vents, and air cleaning and filtration. Limited evidence is available, and none supports the significant reduction of health effects on those exposed.

3. Mixed Occupancy of Smokers and Nonsmokers: If smoking is allowed throughout a space or a collection of spaces served by a single air handler, with no effort to isolate or separate the smokers and nonsmokers, there is no currently available or reasonably anticipated ventilation or air cleaning

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system that can adequately control or significantly reduce the health risks of ETS to an acceptable level.

This situation includes unrestricted smoking in homes, dormitories, casinos, bingo parlors, small workplaces, and open plan office spaces. Air cleaning, dilution ventilation and displacement ventilation can provide some reduction in exposure, but they cannot adequately control adverse health effects, nor odor and sensory irritation for nonsmokers in general.

Ongoing trends, studies and research:

- Electronic nicotine delivery systems (ENDS) are increasing in use and the health effects of primary and secondary exposure continue to be revealed. ENDS and other related exposures in the indoor environment, including those arising from cannabis combustion and use of hookahs, are outside the scope of this position document. ENDS are addressed in an ASHRAE Emerging Issue Brief.
- Third-hand smoke, which results from the release of contaminants from the clothing of smokers and other surfaces, is a relatively new concept. There is evidence of potential hazards³⁹ and researchers are still studying it⁴⁰.

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3. RECOMMENDATIONS

- ASHRAE is committed to encouraging lawmakers, policymakers and others who exercise control over buildings to eliminate smoking inside and near buildings.
- ASHRAE's current policy (ROB 1.201.008) is that Standards and Guidelines shall not prescribe ventilation rates or claim to provide acceptable indoor air quality in smoking spaces. This PD recommends extending such policy to other ASHRAE documents.
- ASHRAE holds the position that the only means of avoiding health effects and eliminating indoor ETS exposure is to ban all smoking activity inside and near buildings. This position is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects and therefore,
 - The building and its systems can reduce only odor and discomfort but cannot eliminate exposure when smoking is allowed inside or near a building.
 - Even when all practical means of separation and isolation of smoking areas are employed, adverse health effects from exposure in non-smoking spaces in the same building cannot be eliminated.
 - Neither dilution ventilation, air distribution (e.g., "air curtains") or air cleaning should be relied upon to control ETS exposure.
- ASHRAE recommends that building design practitioners work with their clients to define their intent, where smoking is still permitted, for addressing ETS exposure in their building and educate and inform their clients of the limits of engineering controls in regard to ETS.
- ASHRAE recommends that multifamily buildings have complete and enforced smoking bans inside and near them in order to protect nonsmoking adults and children.
- ASHRAE recommends, given current and developing trends, that further research be conducted by cognizant health authorities on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs, using ENDS, and engaging in other activities commonly referred to as vaping or using e-cigarettes.

REFERENCES

Note to Reviewers to be deleted in final version: The following shows the citations from the 2014-2017 PD versions that are retained and some new ones. In the final copy, the numeration needs to be compacted (eliminate numbers not used), and to meet ASHRAE Pub requirements, method of citation (author date), and formatting of each may need to be modified. This is all editorial and can happen after the vote(s).

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Title: Environmental Tobacco Smoke (ETS)

Purpose: To inform ASHRAE membership and the public about the health effects of ~~involuntary~~ secondary exposure to ~~tobacco~~ smoke from the combustion of tobacco.

Scope:

- Define what is meant by ETS, passive smoke, and ~~involuntary~~ secondary exposure to smoking
- Describe the types of indoor environments where ETS exposure might occur.
- Reference health effects associated with ~~involuntary~~ secondary exposure to tobacco smoke.
- Report on worldwide efforts to reduce/restrict ~~involuntary~~ secondary exposure.
- Recommend that ASHRAE members follow the guidance available in local/state code and/or ASHRAE documents/standards.

Title:

“Filtration and Air Cleaning “Position Document (PD)

Purpose:

To inform ASHRAE membership and the public about the effects of air cleaning technologies for health and comfort. Both packaged air cleaners and HVAC integrated air cleaning and filtration systems will be considered.

Scope:

The scope of the proposed Position document is as follows:

1. Briefly characterize air cleaning technologies and their applications (outdoor and/or indoor air), and the associated health-relevant performance:
 - a. Clarify what is meant by air filter, cleanable media, gaseous or gas-phase filter, air cleaner, “air purifier”, ionizing air treatment, photo catalytic air cleaner, microbial deactivation, UVGI, ozone generator, electrets, plants and other terms;
 - b. Discuss technologies available to the commercial or residential consumers, the technologies employed and their potential health and comfort effects.
2. Reference health and comfort effects documented in published, peer reviewed journals, associated with the various technologies.
3. Describe the role and health implications of optimal use of air cleaners, maintenance and changing of air cleaning media.
4. Describe to which extent using air cleaning and filtration technologies can offset ventilation for acceptable IAQ.
5. Based on the authoritative health-relevant literature, state consensus information about the relative merits of various techniques.
6. State the consensus information about the development of the technology in this subject area.
7. Stay away from any product commercialism and/or endorsement or disparaging words about specific products and manufacturers.

To: TECHNOLOGY COUNCIL Document Review Sub Committee

Originator: Lew Harriman

Date: 11/29/2011

Title: Limiting Indoor Mold and Dampness in Buildings

Purpose for the Position Document:

To inform ASHRAE members, policymakers, regulators and the public at large about positions held by ASHRAE that can help to minimize the potential for either indoor mold or dampness in buildings.

Scope proposed for the Position Document:

1. Describe positions held by ASHRAE that help to limit any risks that are known (by either cognizant authorities or credible research) to be associated with either indoor mold or building dampness.
2. Describe factors known within the ASHRAE community that have been (frequently):
 - a. Observed to either increase or reduce the potential for growing mold or accumulating excessive moisture inside buildings and which are also...
 - b. Known to have been influenced in the past by decisions and actions taken by building professionals, building occupants or government policymakers and regulators.

ASHRAE Members, Committees with topic interest:

1. Environmental Health Committee
2. TC 1.12 (Moisture Management in Buildings)

Desired Time Frame: 12 months