ASHRAE Meeting Minutes

TC 9.6 Health Care Facilities

Indianapolis Hybrid Annual Conference

Main Meeting: Sunday, Jun 23, 2024, 5:00 to 7:00 PM EDT

Location : JW Marriott, White River AB (1) and Virtual

(Mead, Chair; Eldridge, Vice-Chair; Granzow; Secretary)
Virtual (MS Teams):

SUBCOMMITTEE MEETINGS were held in person AND virtually on Sunday Jun 23 at the times indicated below.
Location: JW Marriott, White River AB (1) and Virtual

TC 9.6 **Handbook**	(English, Chair)	12:00-12:30pm
TC 9.6 **Energy**	(Leach, Chair)	12:30-1:30pm
TC 9.6 **Program**	(Granzow, Chair)	1:30-2:00 pm
TC 9.6 **Infectious Diseases**	(Neu, Chair)	2:00-3:30 pm
TC 9.6 **Research***	(Thomsen, Chair)	3:30-4:30 pm CST

* Being held jointly with SSPC 170 Research Subcommittee

See attachments for notes/minutes from the individual subcommittee meetings which have been provided by the various chairs for inclusion.

Attendance: See attached sign in sheets.

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 interest. (See full Code of Ethics: https://www.ashrae.org/about/governance/code-of-ethics)

ASHRAE Commitment to Care

The health and safety of all ASHRAE conference attendees is a top priority. Out of respect for our fellow attendees, we commit to wear masks indoors, monitor our health, seek medical attention if symptoms develop and adhere to all ASHRAE Commitment to Care protocols. We are committed to the well-being of one another.

Item	Description	Person	Time (min)
1	Introductions, agenda, conference call and attendance documentation instructions • See attachments for attendee list.	Mead	5
2	Roll call, quorum check. Mead, Kenneth X Granzow, Frederich X Thomsen, David X	Granzow	2

	Bhansali, Amit X Burley, Brendon X English, Travis X Kondrat, Paul X Mousavi, Ehsan Phelps, Erick X Wilson, Laurence X Lemire, Nicolas X		
3	Minutes (both Jun '23 & Jan '24) • Acceptance of minutes moved by Eric Granzow, second by Nicolas Lemire – Passed 9/1/0/1	Granzow/Eldridge	5
4	Membership Chair Report, Roster Changes, Welcome PCM's • Ken Mead presented the membership update. See attached for slide presentation. • Kudos to Amit Bhansali for his service as voting member. • Ken Mead asked for any volunteers to work with Ron Westbrook to potentially take over as Membership Chair in the future. Please contact Ken Mead if interested.	Westbrook	5
5	Chair's Report TAC Breakfast Meeting • Ken Mead provided an update from the meeting. • We have a new TAC liaison, Joy Altweis. Joy provided a brief update on the updated member process. • Center of Excellence Building Decarbonization has been created. https://www.ashrae.org/about/cebd-center-of-excellence-for-building-decarbonization o Slides from a presentation are attached. • Global Technical Interactions Committee is a new standing committee to promote ASHRAE internationally. • ISO – International Organization for Standardization. ANSI is the US representative. • ASHRAE is looking for SMEs to represent ASHRAE in various	Mead	3

	government affairs pursuits.		
7	Handbook Subcommittee Report • Travis English provided a brief update. • Subcommittee is gearing up and have standing meetings on a 6 week cycle. Contact Travis if interested in being added to the invite.	English	5
8	Energy Subcommittee Report • Jennifer Leach opened with a plug for the Women In ASHRAE Leadership Symposium Sept 26-27 in Chicago. • Jennifer Leach provided a brief update. • Highlights include updates on the RHEVA and ASHRAE decarb guides. • Travis English created a Google Drive to collect information and promote discussions related to building load profiles and obstacles to high performing buildings. • Looking for evidence of the top 5 energy users.	Leach	5
9	Programs Subcommittee Report • Eric Granzow provided a brief update. Primary focus of the discussion was to identify topics and presenters as well as form a small group to promote and reinvigorate TC 9.6 programs at the Annual and Winter meetings.	Granzow	5
10	Infectious Diseases Subcommittee Report • Ken Mead provided a summary. • There was a presentation by …. This is provided as an attachment. • There was a presentation by Traci Hannigan on the final report from the Epidemic Task Force which was approved in March. There are some do outs from that report that will be inherited by the ID subcommittee. Those interested in topics should contact Dylan Neu. • ID in the news takeaways included respiratory diseases, Measles, Bird Flu.	Neu	5

11	Research Subcommittee Report
	• David Thomsen presented an update on current research projects. The slides are attached for reference.
	• Does the Design Guide need a PTAR?
	  ○ George Augustini volunteered to help push an update forward.
	  ○ Need to reach out to publications
		Thomsen	5

	committee. Kurt Montiero and Jennifer Leach will work on determining how to make this happen.		
12	Webmaster Report •	Augustini	3
13	Section Head Comments • Provided by Joy Altweis (see above)	Cochran	5
14	ALI • Occurring during this meeting. • Update provided on courses provided between meetings.	Burrough	3
15	Liaison Reports -Std 241 • Travis English provided an update. • There is a document in progress to correlate 170 to 241. -Std. 170 • Jeremy Fauber provided an update. Meeting is Monday at 2 and Tuesday at 9. Two addenda are out for review. Three more will be published shortly. -Std. 189.3 • Two addenda out for public comment. -Std. 188 • Jonathan Flannery provided an update. SSPC 400 will take over 188 and 514. No open addenda and waiting for 400 to be formed. -Std 90.1 • No representative present. -Std 55 • Brendan Burley provided an update. Working on next edition. Overheating is being considered. Clo and Met updates are in progress. Humidity is no longer a comfort issue for Standard 55. -Std 62 • Five addenda published. Includes humidity limits, update to louvers. There is currently an emergency modes addenda out for review. Comments are appreciated. -Environmental Health • Linda Lee provided an update. Meeting is Monday morning. There are 6 seminars at the Annual meeting. • Evaluation of in room air cleaners testing now includes 4 pathogens. -ACH MTG	?? Fauber Vernon Darwich Poots Burley Taylor Lautz	2 2 2 - 2 2 2 2

	• A work statement is being prepared for research. • The conference paper and seminar are proposed for Orlando. Results paper is available for download.		
16	Healthcare Decarbonization Guide (ASHRAE/ASHE collaboration) • Approved yesterday for publication. PDF version will be available week of 6/24 with print available later this year.	Walt Vernon	5
17	**Special Presentation & Discussion**: Relative Humidity Study in Operating Rooms • Research occurred between 2018 and 2024. • Results manuscript is projected to available for publication in 2024 Q3. • Recommendation from results is to increase minimum RH to 30%. Results suggest that 35% was better than 20% and 50% was better than 20% but there is ambiguity between 35% and 50%.	Jennifer Wagner	15
18	Vice-Chair Remarks • Reminder to sign in.	Eldridge	2
19	Closing Remarks	Mead	2

Eric Granzow

From: Mead, Kenneth R. (CDC/NIOSH/DFSE/EPHB) <kcm3@cdc.gov>
Sent: Sunday, June 23, 2024 5:57 PM
To: Eric Granzow
Subject: FW: UPDATE on ALI classesRE: Dinner reservations

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ALI Report for minutes

From: Burroughs, Donald R. <dburroughs@Dewberry.com>
Sent: Sunday, June 23, 2024 12:57 PM
To: Mead, Kenneth R. (CDC/NIOSH/DFSE/EPHB) <kcm3@cdc.gov>
Subject: UPDATE on ALI classesRE: Dinner reservations

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Thanks Ken! That works. I'll plan on joining.

For the agenda item on ALI:

Following are the classes I have done this year:

Winter Conference, Jan 3rd, full 6 hour class.

Spring Online Series, April 16 and 17, 6 hour class in two parts.

National Institute of Health (NIH) May 21, 22. Full 6 hour class in two parts.

I'll be teaching the half day class today from 3:30-6:30 pm.

We are looking at dates to offer the 6 hour class with the Fall Online Series.

The ALI coordinators are also working with me to develop a series of 1 hour "lunch and learn style" short courses. More to come on that.

The ALI group tells me this class continues to be one of the best selling classes.

Donald Burroughs, PE

Vice President, Mechanical Chief Engineer

Engineering Services
2610 Wycliff Road, Suite 410
Raleigh, NC 27607-3073
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www.dewberry.com

From: Mead, Kenneth R. (CDC/NIOSH/DFSE/EPHB) <kcm3@cdc.gov>
Sent: Sunday, June 23, 2024 12:32 PM
To: Burroughs, Donald R. <dburroughs@Dewberry.com>
Subject: RE: Dinner reservations

You don't often get email from kcm3@cdc.gov. Learn why this is important

[CAUTION] External Email. DO NOT click links or open attachments unless expected. Please use the "Phish Alert" button to report all suspicious emails.

Thank you for your response!
Reservation is for 8 PM at Fogo de Chao (Brazilian Steak House):
Indianapolis IN | Brazilian Steakhouse Restaurant | Fogo de Chão (fogodechao.com)

If your plans have changed and/or this location/time are no longer compatible with your plans, please advise so I can inform the restaurant accordingly.

Thank you!

-Ken

From: Burroughs, Donald R. <dburroughs@Dewberry.com>
Sent: Sunday, June 23, 2024 12:26 PM
To: Mead, Kenneth R. (CDC/NIOSH/DFSE/EPHB) <kcm3@cdc.gov>
Subject: RE: Dinner reservations

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I'm interested if it's 7 or later. I teach the heathcare design class from 3:30 – 6:30.

Don Burroughs, text 919-612-6174

Donald Burroughs, PE

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From: Mead, Kenneth R. (CDC/NIOSH/DFSE/EPHB) <kcm3@cdc.gov>
Sent: Friday, June 21, 2024 8:52 PM
To: Eric Granzow <egranzow@olsson.com>; pavel.likhonin@gmail.com; david.thomsen@providence.org; jpfauber@heapy.com; rlautz@aeieng.com; Neu, Dylan T. (CDC/NIOSH/DFSE/EPHB) <xhw2@cdc.gov>; rwestbrook@twcny.rr.com; gaugustini@mazzetti.com; amit.bhansali@wsp.com; brendon.burley@gmail.com; Travis R. English <travis.r.english@KP.org>; sdfpe65@gmail.com; pkondrat@hotmail.com; mousavi@clemson.edu; ephelps@burns-group.com; lvwilsonpe@yahoo.com; babel@aafintl.com; dabellon@pwsigroup.com; dadkison@f-t.com; cahne99@gmail.com; taisueni@red-eng.com; Krishnaa.ajith27@gmail.com; elieakyky@gmail.com; mralazazi@yahoo.com; tyler.anderson@chemaqua.com; tyler.anderson@chemaqua.com; nicholas.augustin@wsp.com; gaugustini@mazzetti.com; john.aykroyd@nch.com; jeremy@pearsonengineering.com; biraj.bhandari@hotmail.com; arupb@lsu.edu; bryan.boehm@tlc-eng.com; bryan.boehm@tlc-eng.com; dustin.bowling@provisionenvironmental.com; brito.victor30@gmail.com; Burroughs, Donald R. <dburroughs@Dewberry.com>; douglas.cage@masonandhanger.com; ptcantin@mmicmedical.com; jcarter@cppwind.com; civncibi87@gmail.com; arunjc89@gmail.com; ron.conner@kiewit.com; mcorbat@rensafiltration.com; mike.craig@rwdi.com; duncan.curd@dristeem.com; snehal.desai@va.gov; eric.desplinter@astraleng.com; brendan.s.dingman@usace.army.mil; dorothy.2@osu.edu; mike.dunne@howorthgroup.com; dennis.earley@carrier.com; abdullah.ibrahim2011@yahoo.com; lawrence.enright@hcai.ca.gov; aestes@enfinityeng.com; alejandrofbonilla@gmail.com; scott.fielder@evergreentelemetry.com; jfitzpatrick@alvine.com; charles.foster@hcahealthcare.com; michaeldfrey@yahoo.com; josephgaied@gmail.com; gallagr1@ferris.edu; Ron@Plumb-TechLLC.com; krisgeyson@gmail.com; brandon.gross@aah.org; gmgross@gmail.com; mia.guo@p2sinc.com; sayanihari@yahoo.com; sayanihari@yahoo.com; sayanihari@yahoo.com; JHauska@eabcoinc.com; rob.hoadley@argyllassociates.ca; Hockaday, Weston <whockaday@Dewberry.com>; jhunley@mercy.com; idzik.paul.t@gmail.com; haily.fernald@gmail.com; abdulahii@anteccontrols.com; givester@live.com; nivedita.ashrae@gmail.com; kathirvelj@gmail.com; adam.judge@tlc-eng.com; starlang@pittsburghairsystems.com; pennst8jen@yahoo.com; tleigh986@gmail.com; dleo@cosentini.com; lcw@leongcw.com.sg; lisa.bradway@gmail.com; tlewis@peifla.com; chen-wei.liu@honeywell.com; pmaccormac@baskervill.com; ray.p.mans@gmail.com; jmartin@specializedeng.com; baileyime@gmail.com; jeffery.mcclain@uchicagomedicine.org; matthew.mclaurin@greenheck.com; ing.pedrojmedina@gmail.com; jmed0004@shands.ufl.edu; chris.miller@p2sinc.com; kurt.monteiro@smithandandersen.com; moussawiali@gmail.com; chelseaASHRAE@gmail.com; smumm@uwhealth.org; mohammedmurtaza024@gmail.com; mohammedmurtaza024@gmail.com; rmurugesan@brplusa.com; mohmnasr@gmail.com; nikolas@centralife.gr; cnorberg@NEMIConline.org; mnorbut@klhengrs.com; parkerth@smh.ca; eeparryn@syr.edu; uddaperera@yahoo.co.uk; rachelp@anteccontrols.com; peterssn@vcu.edu; lquinn@ajmfg.us; mh.rafati@usask.ca; srankhorn@fdllc-cx.com; drausch@phoenixcontrols.com; tahir.razza@outlook.com; vish@unl.edu; srenshaw18@gmail.com; guto.rios@prmt.com.br; zainul.mustafa@carrier.com; sara.robbins@hdrinc.com; rol.jack@mayo.edu; ben@benrussell.ca; dan@norbryhn.com; saeedmfarooq@gmail.com; ali.shirazi.salim@gmail.com; d.samayoa@mac-eng.ca; zahra.sardouei@gmail.com; branden.j.schneider@gmail.com; madison.schultz@gmail.com; semeradg@jbb.com; gserauto@envelopgroup.com; stevesill1966@hotmail.com; marcus.simioni@gmail.com; acsittoni@gmail.com; sierraspitulski@gmail.com; Martin.Stangl@rwdi.com; subhash_sule@yahoo.com; minki.sung@gmail.com; stephanie@b4hinc.com; timtheriault@live.com; rupesh.umtol@electromech.co.in; rajenbvyas@gmail.com; ajwillman7000@ajwi.world; twilloug@hdrinc.com; willsz@jbb.com; bcworthen@gmail.com; nickyunshu@gmail.com; sina.yousefi@aafintl.com; arshad_h_zaidi@yahoo.com; john.zhai@colorado.edu; mralazazi@yahoo.com; danders@sheetz.com; KatjaDorisAuer@yahoo.com; abare@newcomb-boyd.com; dbarnes@karpinskieng.com; mbender@benderdean.com; ab.blalock@jacobs.com; sbordenkecher@specializedeng.com; angela.bowman@boldt.com; burnsbradford@gmail.com; david.j.braidich@usace.army.mil; michael.calabrese@tlc-eng.com; FacPerfEng@comcast.net; John_Castelvecchi@comcast.net; jeffC@BVHis.com; oscar.cobb@smithgroup.com;

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Subject: Dinner reservations

Some people who received this message don't often get email from kcm3@cdc.gov. Learn why this is important

[CAUTION] External Email. DO NOT click links or open attachments unless expected. Please use the "Phish Alert" button to report all suspicious emails.

My apologies for the extra spam!

Hello TC 9.6 Members and Guests,

Are you interested in going to a group dinner together following the TC 9.6 meting? If so, please respond to this email (directly to me) and indicate your interest and the number of anticipated attendees. If you have suggestions, I am open to hear those as well. The two recommendations I received are either budget busters or closed. I currently have a couple of spots in mind (Killroys or High Velocity) but need some attendance estimates to close the deal.

Looking forward to seeing you (virtuall.y or in person) in Indy!

-Ken

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TC 9.6 Membership
June 23, 2024

- 251 overall members
- 12 Voting members
- 127 Corresponding members
- 108 Provisional Corresponding Members
- 39 YEA members

Executive team

TC Officers (Through June 30, 2025)

- TC Chair: Ken Mead
- Vice Chair: David Eldridge
- Secretary: Eric Granzow

Roster changes
2024 Society year

Voting members, terms expiring June 30, 2024

Amit Bhansali

New Voting Members effective July 1, 2024

George Augustini

Jennifer Leach

Gina Semerad

Voting Members
2024-25 Society year

Ehsan Mousavi (2025)
Lawrence Wilson (2025)
Eric Granzow (2026)
Ken Mead (2026)
Erick Phelps (2026)
Brendan Burley (2027)
David Thomsen (2027)
Travis English (2027)
Paul Kondrat (2027)
George Augustini (2028)
Jennifer Leach (2028)
Gina Semarad (2028)

Nicolas Lemire (Member-Non Quorum)

Subcommittee chair and officers
2024-2025 Society year

- Handbook (Applications, Chap. 8): Travis English
- Research: David Thomsen
- Standards: Jeremy Fauber
- Programs: Eric Granzow
- Membership: Ron Westbrook
- Healthcare Energy subcommittee: Jennifer Leach
- Infectious Diseases subcommittee: Dylan Neu
- Webmaster: George Augustini
- ALI Coordinator: Don Burroughs
- TC associated MTG (MTG-ACR, Air exchange rates): Roger Lautz

TC 9.6 Healthcare Facilities – Programs Subcommittee

Sunday 06/23/2024, Hybrid

I. Introductions

II. TC 9.6 Sponsored Programs/Courses at 2024 Summer Meeting (0)

III. Other Programs/Courses of Interest at 2024 Summer Meeting (4)

Forum 1: Basics of Air Change Rates

Sunday, June 23
8:00 AM – 9:00 AM EDT

Program Level: Basic | Program Track: Fundamentals and Applications | Session Type: Forum | Location: JW Marriott – Indianapolis, Grand Ballroom 1 | Show 1 more tag

Summary:
The supply airflow requirements for healthcare, cleanrooms, and laboratories facilities are often specified as Air Change Rates (ACR). Over the years several notions have been developed about ACR. This forum will systematically evaluate validity of popular notions regarding the ACR. The main objective of this session is to provide basic principles of air change rates. It will demonstrate where ACR may be the appropriate metric and what other factors that designers of ventilation systems should consider. Attendees are encouraged to bring their laptops and use Excel spreadsheets to test various scenarios to test the impact of ACR on various parameters.

Chair:
Kishor Khankari, PhD

Technical Committee:
MTG.ACR Air Change Rate

Co-Sponsoring Committee:
9.11 Clean Spaces

Other Sponsoring Committee:
9.10 Laboratory Systems

Location: JW Marriott – Indianapolis, 3, Grand Ballroom 1

Seminar 19: LIVESTREAM: Farewell VRP: Paving the Way for Indoor Air in the Future of Ventilation and Air Quality

Sunday, June 23
3:15 PM – 4:45 PM EDT

Program Level: Intermediate | Program Track: Legislation, Standards, Codes, and Guidelines | Session Type: Seminar | Days: Sunday, 23 June

Summary:
The IAQP in ASHRAE 62.1 has undergone significant enhancements, now incorporating specified design compounds and particulate matter with their established design limits. Additionally, there is a newfound emphasis on evaluating the impact of mixtures on human health. These improvements build upon the IAQP's longstanding requirements for mass balance analysis and extend to testing in finished spaces, complete with specific test method specifications and equipment accuracy standards. These advancements in IAQP within ASHRAE 62.1 not only enhance ventilation air quality standards but also hold the potential to serve as a model for achieving energy savings across the board.

Chair:
Hoy Bohanon, PE

Other Sponsoring Committee:
SSPC62.1, SSPC170

Forum 5: The Future of Coordination between Standards 62.1 and 170

Monday, June 24
11:00 AM – 12:00 PM EDT

Program Level: Intermediate | Program Track: Legislation, Standards, Codes, and Guidelines | Session Type: Forum | Location: JW Marriott – Indianapolis, Grand Ballroom 3 | Show 1 more tag

Summary:
Healthcare facilities are complex buildings that have a mix of "€œhealthcare spaces"€ and "non-healthcare spaces". Designers of a healthcare facility will find themselves applying two standards, ASHRAE Standard 62.1 and Standard 170, side by side. Since 2017, the two standards committees established official liaisons to help coordinate the standards which has culminated in the publication of a unified method to do 62.1-170 ventilation calculations and, for the first time, adoption 62.1 Natural Ventilation Procedure to Healthcare spaces. But what does the users of both standards like to see further coordinated in the future?

Chair:
Abdel Darwich, PE, LEED AP

Other Sponsoring Committee:
SSPC 62.1 and SSPC 170 both voted to co-sponsor this firum

Location: JW Marriott – Indianapolis, 3, Grand Ballroom 3

Seminar 37: Particle and Contaminant Tracking for Health and Safety

Tuesday, June 25
11:00 AM – 12:30 PM EDT

Program Level: Intermediate | Program Track: Research Summit | Session Type: Seminar | Location: JW Marriott – Indianapolis, Grand Ballroom 3 | Show 1 more tag

Summary:
This seminar shares the latest research findings in indoor environmental modeling, with a particular focus on particle and contaminant tracking for health and safety.

Chair:
James VanGilder, PE

Technical Committee:
4.10 Indoor Environmental Modeling

Co-Sponsoring Committee:
2.3 Gaseous Air Contaminants and Gas Contaminant Removal Equipment

Other Sponsoring Committee:
TC 2.3, TC 2.4, EHC

Location: JW Marriott – Indianapolis, 3, Grand Ballroom 3

IV. Orlando, FL 2025 Winter Meeting, February 8 – February 12, 2025

Overview of Conference Tracks:

1. Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

Track Chair: Erik Sanchez | esanchez@prmech.com

2. HVAC&R systems and equipment are constantly evolving to address the changing requirements of the built environment. Papers and programs in this track focus on the development of new systems and equipment, improvements to existing systems and equipment and the proper application and operation of systems and equipment.

Track Chair: Li Song | lsong@ou.edu

3. Refrigeration is a critical element of modern life, from preserving food and medicine to maintaining comfort. With significant changes on the horizon for refrigerant regulations, along with new applications for refrigeration systems, understanding both the fundamental and advanced concepts and issues related to refrigeration is more important than ever before. Papers and programs in this track focus on refrigerants and their regulations, refrigeration cycles and applications.

Track Chair: Jon Cohen | jonjcohen1@gmail.com

4. Thermal and electrical energy storage can alleviate the mismatch between renewable energy availability and peak building energy demands, enabling the incorporation of more renewable energy into the grid. Integration of thermal energy storage (TES) with residential and commercial building envelopes or HVAC systems would reduce buildings' heating and cooling loads, level out peak energy demand, reduce HVAC size, increase energy savings, improve occupants' thermal comfort and allow flexibility for shedding and shifting building loads. These benefits will improve grid resiliency, thereby enabling more cost-effective electrification of buildings. Papers and programs in this track focus on advances in cost-effective TES materials and systems, integration of thermal TES in building envelopes or HVAC systems and grid resiliency.

Track Chair: Robin Bryant | RBryant@bandiflorida.com

5. Decarbonization is urgently needed to slow climate change that is affecting the planet. Approximately 10% of global CO_2 emissions is attributable to embodied carbon in building materials and construction processes. Energy use in buildings accounts for about 40% of energy-related carbon emissions. Therefore, to accomplish building decarbonization goals, accounting for embodied carbon and carbon emissions from operational energy use is essential. ASHRAE and its members are leading the advancement of carbon neutral, net zero energy and decarbonization strategies in new construction, renovation and HVAC&R design for residential and commercial buildings.

This track highlights case studies and research across the globe on the methods being developed and policies being evolved to reduce carbon impacts on the global environment; tools and resources to make zero energy design and operation more easily achievable; innovative low-carbon materials and state-of-the-art technologies and strategies to achieve zero energy communities and campuses; and policies, regulations, codes, standards and utility and government programs for adoption and scale up of net zero (or net positive) energy building and community initiatives.

Track Chair: Joe Chow | joe.ashrae@gmail.com

6. Artificial intelligence (AI) is being adopted by many aspects in our life. As sensor systems, internet connectivity, building management software and data collection become more sophisticated and ubiquitous, substantial opportunities exist to make buildings and HVAC systems and equipment "smarter." Implementation of AI in building automation and control systems enables using data from Internet of Things devices and occupant behavior to improve operational energy efficiency, occupant comfort, security and maintenance, and to enhance utilization of renewable energy resources (e.g., wind, solar) and energy storage. Submissions in this track focus on applications for AI and machine learning technology in building automation and controls to enhance energy efficiency and comfort, cyber security, fault detection and diagnosis, operation of HVAC systems and equipment for load flexibility, and benefit from time-of-day energy prices.

Track Chair: Suzanne LeViseur | sleviseur@haddadeng.com

7. Development and adoption of industrialized technologies and methodologies can accelerate construction speed, scale and quality. Whereas most other industries have capitalized on digitization and process improvements, building construction practices have experienced slow, incremental changes. Industrialized construction can address shortages in skilled labor while increasing throughput, safety, quality and affordability. Examples include prefabricated mechanical pods, prefab panelized components for building envelopes and modular construction, although more innovation is needed to increase the cost-effectiveness of these approaches. This track disseminates advancements in building construction practices and workforce development and discusses opportunities and challenges associated with conventional and industrialized construction.

Track Chair: Stephanie Mages | s_mages@yahoo.com

8. Indoor environmental quality (IEQ) is a vital consideration during all phases of a building's life because the indoor environment is closely linked to occupant comfort, satisfaction, productivity and health. Proper fire and smoke control design is also crucial for protecting building occupants. This track explores the design, operation and studies of ventilation, air distribution systems, and all IEQ aspects, including noise, vibration and lighting in residential and commercial buildings. Topics include aspects of ventilation and IEQ, such as filtration, changeovers, best practices for maintainability, fire ratings/dampers, detection and ventilation for toxic gases, operator safety in equipment rooms, OSHA requirements, industrial and hazardous spaces, additional occupant health and safety considerations and new building materials.

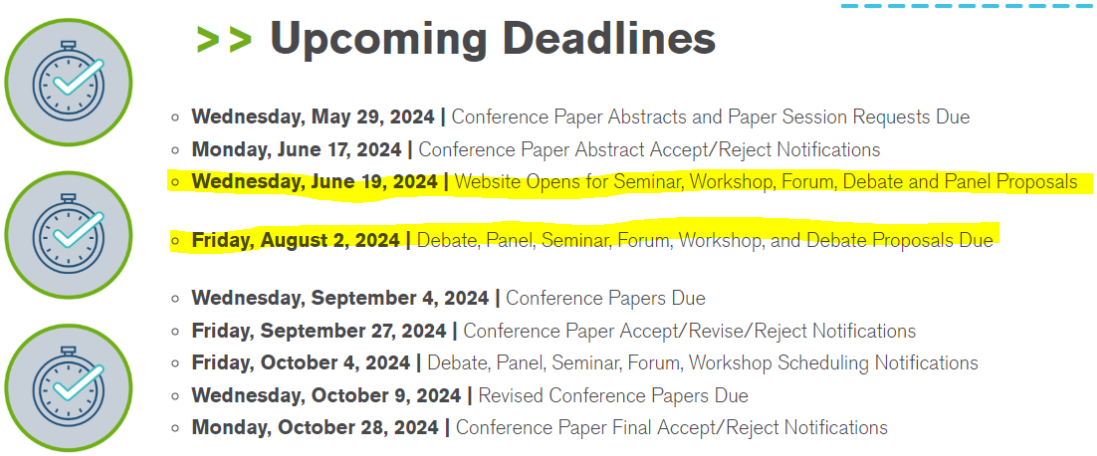
Track Chair: Ehab Mamdouh | ehab.mamdouh@ipec-eg.net

9. In the face of climate change, weather extremes and energy supply disruptions and shortages, methods for designing, constructing and operating buildings and HVAC&R systems must be resilient and sustainable. In fact, resilience is a highlighted aspect of the current ASHRAE strategic plan. This track highlights innovative technologies and strategies that are evolving across the globe that reimagine our relationship with the built environment now and into the future, including design strategies for extreme climates and weather, appropriate responses to energy supply disruptions, and how all these factors are tied to resilience and energy conservation efforts.

Track Chair: Joshua Vasudevan | joshuavasudevan2011@gmail.com

In addition to the tracks above, papers and programs that address Cold Climates are appropriate and encouraged.

Orlando Dates:



V. Future Meetings

- Orlando, FL: 2025 Winter Meeting, Feb. 8 – Feb. 12
- Phoenix, AZ: 2025 Annual Meeting, June 21 – June 25
- Las Vegas, NV: 2026 Winter Meeting, Jan. 31 – Feb. 4
- Austin, TX: 2026 Annual Meeting, June 27 – July 1
- Chicago, IL 2027 Winter Meeting, Jan. 23 – Jan. 27
- New Orleans, LA 2027 Annual Meeting, June 12 – June 16

VI. Discussion on Potential Program Topics

- Resources for future meetings:
  https://www.ashrae.org/conferences/conference-resources/papers-and-programs
- From Prior Meetings:
  - Decarbonization
    - Walt Vernon is leading the MTG on Decarbonization and volunteered to help.
    - Metering and successful implantation of energy recovery
    - Working with staff to understand needs
  - Energy Related Topics
    - Benchmarking Data
      - A presentation from David Eldridge regarding the benchmarking data their group has collected.
      - Canada vs USA Benchmarking Data
    - Energy Modeling Input Profiles Base On Existing Measured Data
    - Unoccupied Setback Controls
    - Adiabatic Humidification (Ben Russell)
    - Geothermal Hospital Lessons Learned
  - Operations and Maintenance of Healthcare Facilities
    - Partner with TC 7.9 in commissioning.

    - Partner with TC 7.7
    - Presentation on important factors/considerations regarding maintenance and operations of HC facilities.
    - Amit Bhansali volunteered a potential speaker regarding the commissioning aspects.
- EUI at design for normal operation vs emergency operation
    - Does emergency operations effect hospital EUI?
    - Dave Thompson, David Eldridge and Walt Vernon have data showing no real increase.
- Epidemic Task Force Results suggested by Jen Leach
- Case studies

VII. Subcommittee Membership

- Searching for a new chair
- The following are interested in assisting with future program efforts
    - Tom Parker
    - Linda Lee
    - Kurt Monteiro
    - Sierra Spitulski
    - George Augustini
    - Jason Hauska – TC 7.7 VC
- From ID subcommittee
    - Debate on best humidity design point

Handbook Subcommittee Meeting

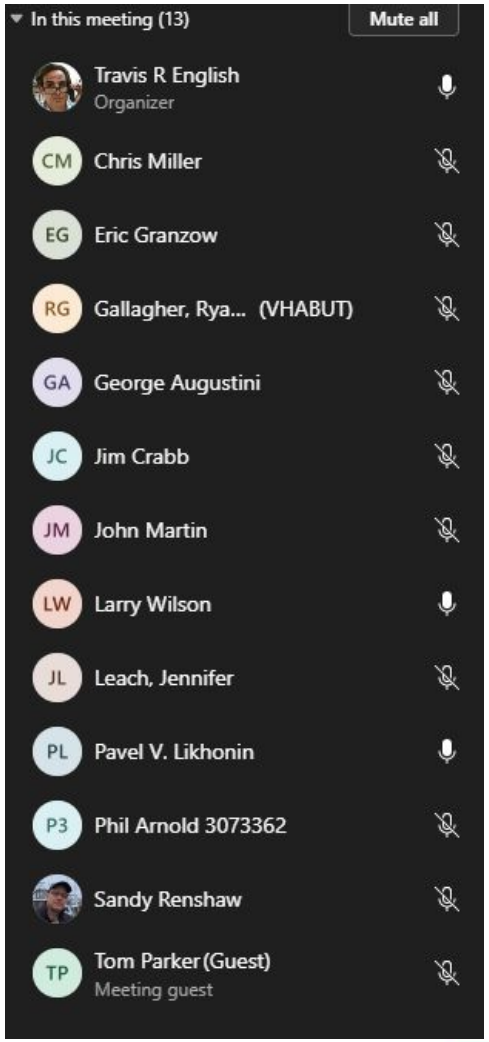
5/7/2024

Travis R. English

Agenda

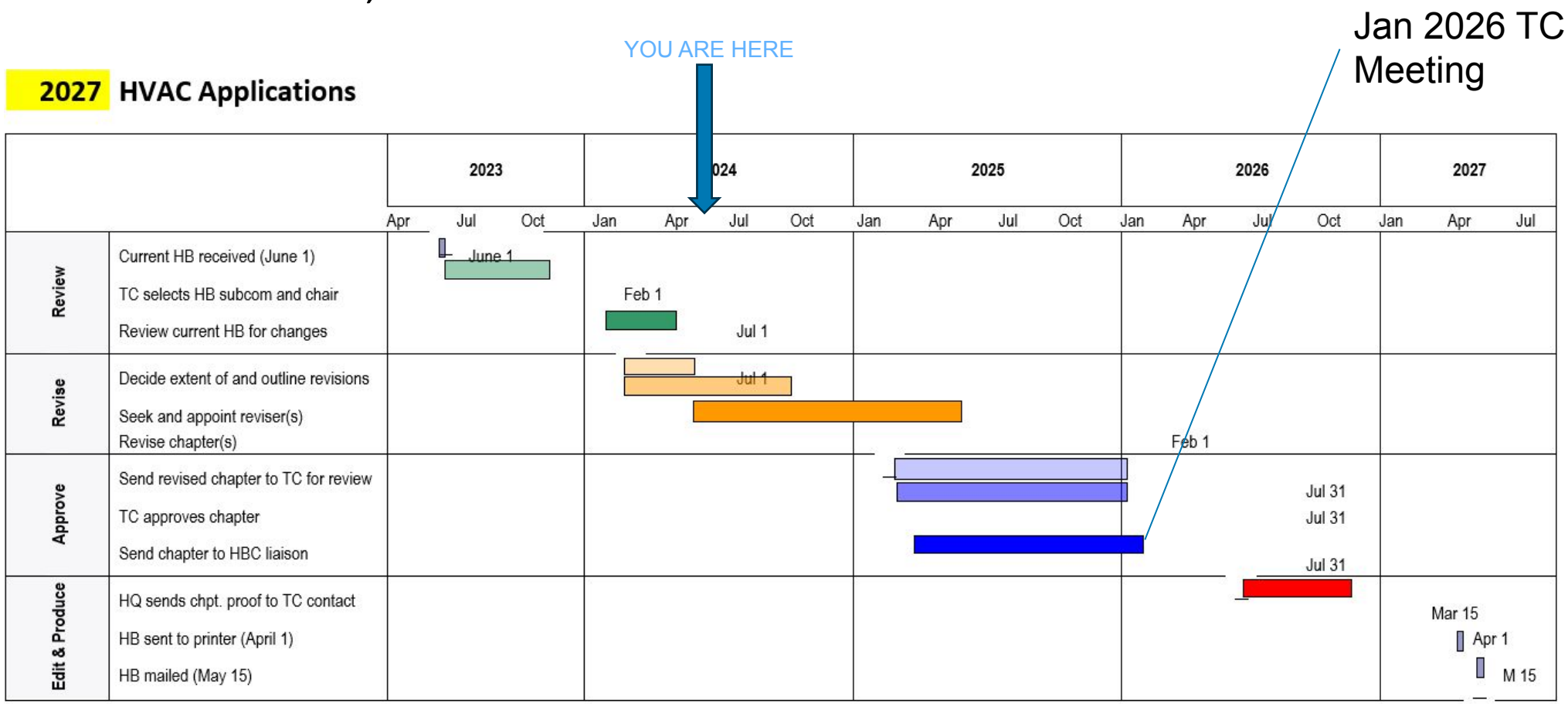
- Timeline
- Project Goals
- Outline Revisions
- Plan for Revisors
- Parking Lot
- Review Next Actions

Attendance 5/7/2024



Timeline

- Generic GATT chart; from ASHRAE



HBC = Society Handbook Committee
HB = Handbook volume
HQ = ASHRAE Headquarters editorial staff

Project Goals

1
- **Update the "State of the Known"**
  - **Include current references from the recent (2019-2024) meta-research.**
  - **Energy -> Decarbonization**

2
- **Update topic: "infectious aerosols"**
  - **Refer and summarize ASHRAE 241 for healthcare settings**
  - **Other sources: series of Journal articles.**

- **Coordinate Common Material with other ASHRAE chapters**

3
- **Edit for Clarity and Conciseness**
  - **If possible, reduce overall page count / word count.**
  - **Current version is 42 pages, 28,000 words (112 minute read).**
  - **Stretch goal would be 25-30 pages, 15,000 words (60 minute read)**

Update “State of the Known”

- **Include relevant conclusions in all sections.**
  - **ASHRAE CO-RP-03**
  - **ASHRAE 1833-RP**
  - **CEC-500-2024-022**
  - **ASHRAE “Decarbonizing Hospital Buildings” (June 2024)**

LW: Lots of moving targets about the basis of air change rates etc. in the last year.
TE: state of the known/state of the unknown.
LW: There are knowns, there are unknowns, we have an ‘obligation to report’. Which facts are no longer open to debate, where is more coming in.

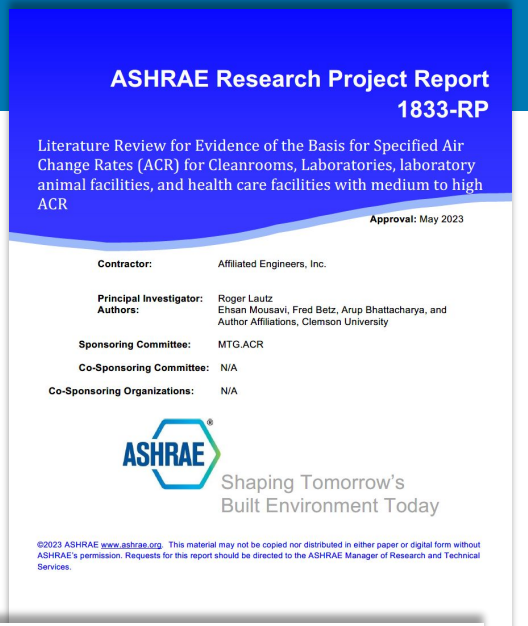

Academic Research to Support Facility Guidelines
Institute & ANSI/ASHRAE/ASHE Standard 170

ASHRAE CO-RP-03

Prepared By:
Clemson University
University of Nebraska - Lincoln
Affiliated Engineers, Inc.

Prepared for:
Facilities Guidelines Institute
American Society for Healthcare Engineering
ASHRAE

Prepared on:
February 28, 2019


ASHRAE Research Project Report 1833-RP

Literature Review for Evidence of the Basis for Specified Air Change Rates (ACR) for Cleanrooms, Laboratories, laboratory animal facilities, and health care facilities with medium to high ACR

Approval: May 2023

Contractor: Affiliated Engineers, Inc.

Principal Investigator: Roger Lautz
Authors: Ehsan Mousavi, Fred Betz, Arup Bhattacharya, and Author Affiliations, Clemson University

Sponsoring Committee: MTG.ACR

Co-Sponsoring Committee: N/A

Co-Sponsoring Organizations: N/A

Shaping Tomorrow's Built Environment Today

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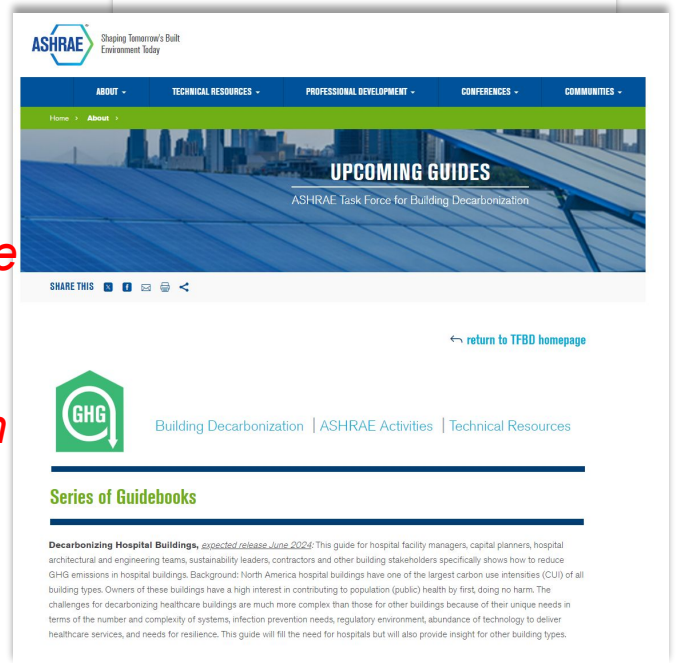
ASHRAE Shaping Tomorrow's Built Environment Today

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UPCOMING GUIDES

ASHRAE Task Force for Building Decarbonization

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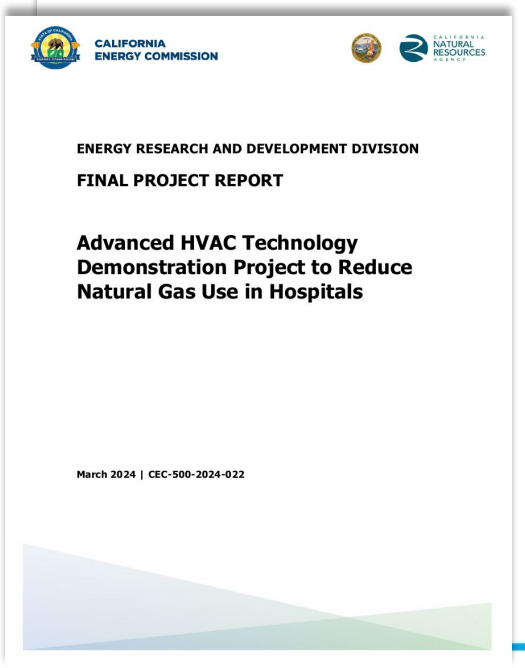
GHG

Building Decarbonization | ASHRAE Activities | Technical Resources

Series of Guidebooks

Decarbonizing Hospital Buildings, *expected release June 2024:* This guide for hospital facility managers, capital planners, hospital architectural and engineering teams, sustainability leaders, contractors and other building stakeholders specifically shows how to reduce GHG emissions in hospital buildings. Background: North America hospital buildings have one of the largest carbon use intensities (CUI) of all building types. Owners of these buildings have a high interest in contributing to population (public) health by first, doing no harm. The challenges for decarbonizing healthcare buildings are much more complex than those for other buildings because of their unique needs in terms of the number and complexity of systems, infection prevention needs, regulatory environment, abundance of technology to deliver healthcare services, and needs for resilience. This guide will fill the need for hospitals but will also provide insight for other building types.


CALIFORNIA ENERGY COMMISSION

ENERGY RESEARCH AND DEVELOPMENT DIVISION

FINAL PROJECT REPORT

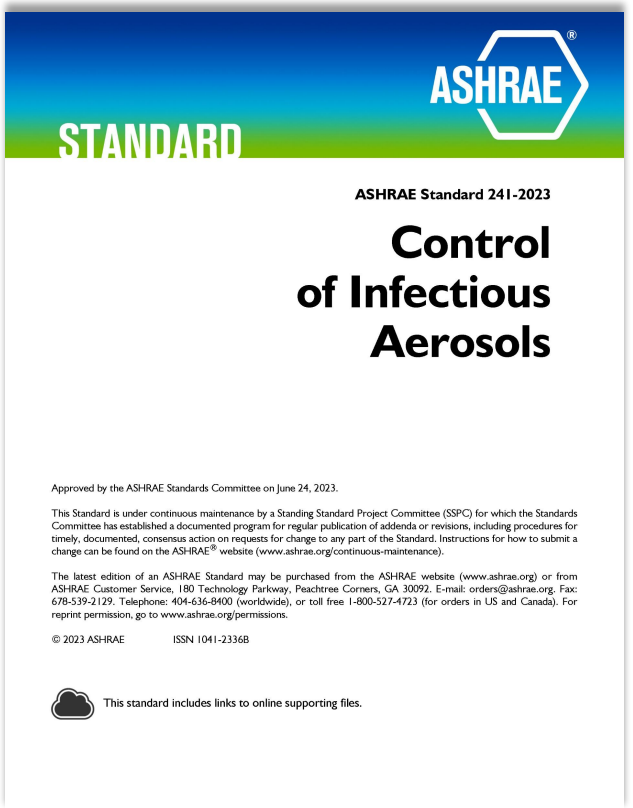
Advanced HVAC Technology Demonstration Project to Reduce Natural Gas Use in Hospitals

March 2024 | CEC-500-2024-022

Update Section “Infectious Aerosols”

LW: clarify difference between ‘contamination control’ and ‘infection control’. Clarify the distinction.

- **Sources:**
  - **ASHRAE 241**
  - **Columns:**
    - ***Infectious Aerosol Control Column: Operating and Maintaining Building Systems: Reducing Risk With ASHRAE Standard 241*** Authors: Meghan K. McNulty, P.E. and Wade H. Conlan, P.E., BCxP Citation:ASHRAE Journal, Vol. 66, no. 4, April 2024
    - ***Models for ASHRAE Standard 241: I Need How Much Clean Air to Control Infection?*** Authors: Benjamin Jones, Dr.Eng. Citation: ASHRAE Journal, Vol. 65, no. 12, December 2023
    - ***Cost-Benefit Analysis of ASHRAE Standard 241*** Authors:Richard Bruns, Ph.D. Citation: ASHRAE Journal, Vol. 65, no. 10, October 2023
    - ***Impact of New Ventilation Guidance, Standard 241 on Energy Costs, Carbon Emissions: Why Equivalent Clean Airflow Doesn’t Have to Be Expensive*** Authors: Marwa Zaatari, Ph.D., Associate Member ASHRAE; Anurag Goel, Associate Member ASHRAE and Joseph Maser Citation:ASHRAE Journal, Vol. 65, no. 9, September 2023
    - ***A First Look at ASHRAE Standard 241*** Authors: William Bahnfleth, Ph.D, P.E., Presidential/Fellow/Life Member ASHRAE; Max Sherman, Ph.D, Fellow/Life Member ASHRAE Citation: ASHRAE Journal, Vol. 65, no. 8, August 2023



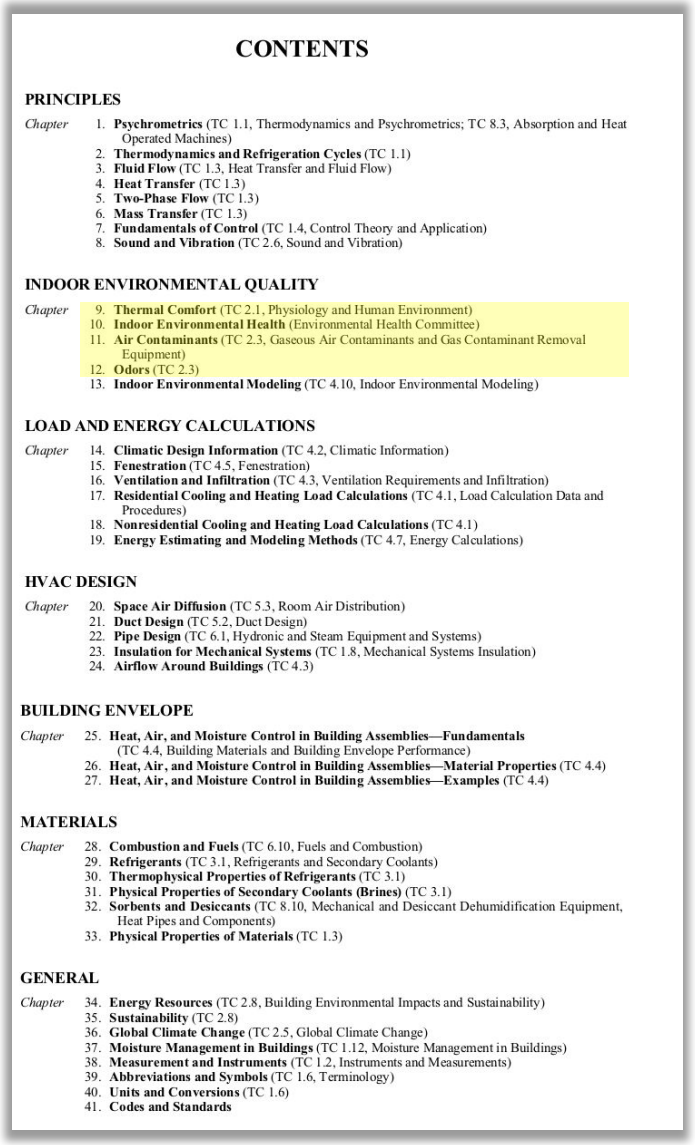
Coordinate Common Material with other ASHRAE chapters

Current chapter text includes

- 20 instances of “air quality”, including one section (section 2.2)
- 44 instances of “comfort”
- 25 instances of “contaminant”
- Those topics are covered in 96 pages in ASHRAE’s Handbook of Fundamentals

Goal:

- **Don’t repeat; refer**
- **Include only what is truly unique to our chapter**
- **Refer general knowledge to those chapters where it is covered in detail.**



CONTENTS

PRINCIPLES

Chapter
1. **Psychrometrics** (TC 1.1, Thermodynamics and Psychrometrics; TC 8.3, Absorption and Heat Operated Machines)
2. **Thermodynamics and Refrigeration Cycles** (TC 1.1)
3. **Fluid Flow** (TC 1.3, Heat Transfer and Fluid Flow)
4. **Heat Transfer** (TC 1.3)
5. **Two-Phase Flow** (TC 1.3)
6. **Mass Transfer** (TC 1.3)
7. **Fundamentals of Control** (TC 1.4, Control Theory and Application)
8. **Sound and Vibration** (TC 2.6, Sound and Vibration)

INDOOR ENVIRONMENTAL QUALITY

Chapter
9. **Thermal Comfort** (TC 2.1, Physiology and Human Environment)
10. **Indoor Environmental Health** (Environmental Health Committee)
11. **Air Contaminants** (TC 2.3, Gaseous Air Contaminants and Gas Contaminant Removal Equipment)
12. **Odors** (TC 2.3)
13. **Indoor Environmental Modeling** (TC 4.10, Indoor Environmental Modeling)

LOAD AND ENERGY CALCULATIONS

Chapter
14. **Climatic Design Information** (TC 4.2, Climatic Information)
15. **Fenestration** (TC 4.5, Fenestration)
16. **Ventilation and Infiltration** (TC 4.3, Ventilation Requirements and Infiltration)
17. **Residential Cooling and Heating Load Calculations** (TC 4.1, Load Calculation Data and Procedures)
18. **Nonresidential Cooling and Heating Load Calculations** (TC 4.1)
19. **Energy Estimating and Modeling Methods** (TC 4.7, Energy Calculations)

HVAC DESIGN

Chapter
20. **Space Air Diffusion** (TC 5.3, Room Air Distribution)
21. **Duct Design** (TC 5.2, Duct Design)
22. **Pipe Design** (TC 6.1, Hydronic and Steam Equipment and Systems)
23. **Insulation for Mechanical Systems** (TC 1.8, Mechanical Systems Insulation)
24. **Airflow Around Buildings** (TC 4.3)

BUILDING ENVELOPE

Chapter
25. **Heat, Air, and Moisture Control in Building Assemblies—Fundamentals** (TC 4.4, Building Materials and Building Envelope Performance)
26. **Heat, Air, and Moisture Control in Building Assemblies—Material Properties** (TC 4.4)
27. **Heat, Air, and Moisture Control in Building Assemblies—Examples** (TC 4.4)

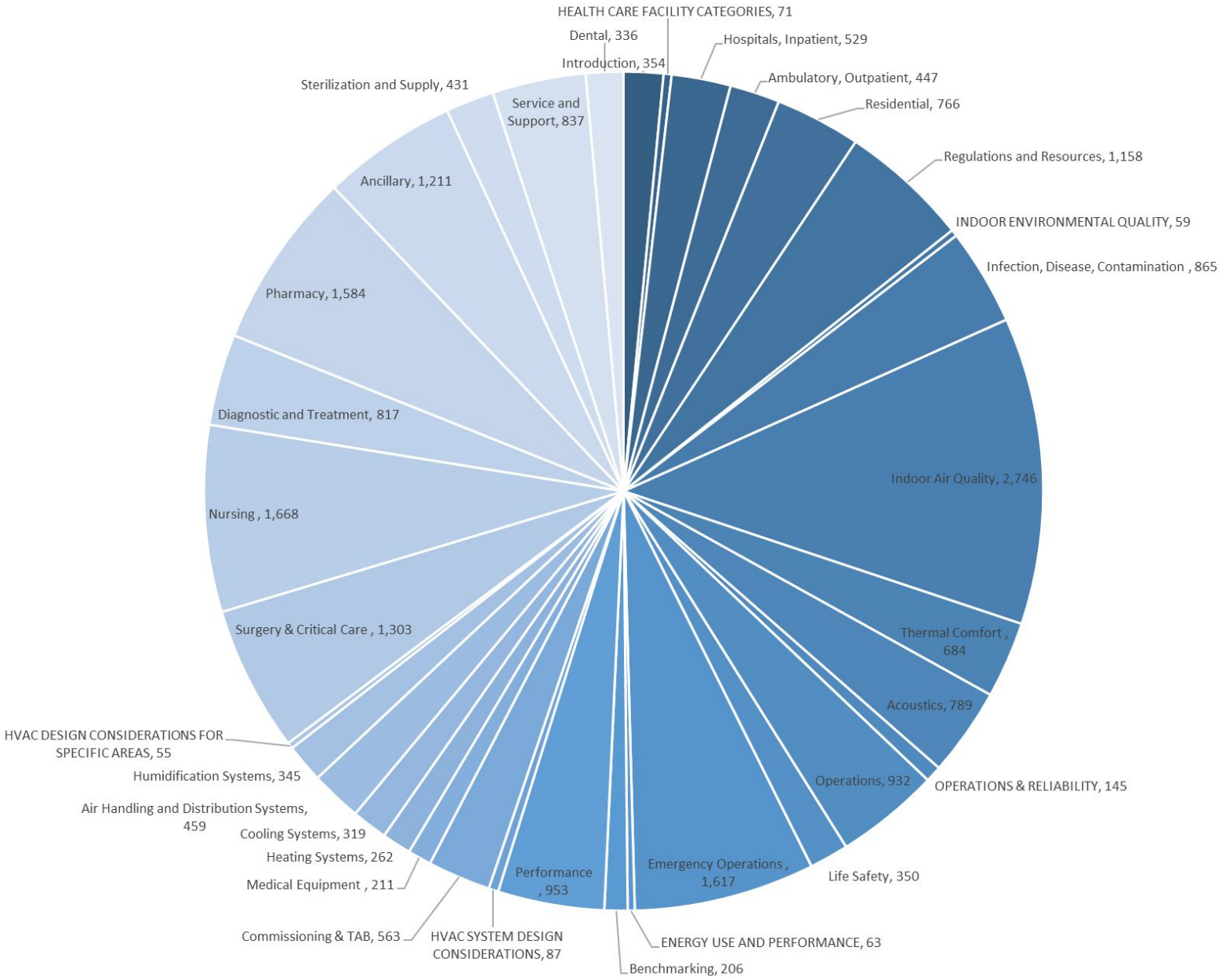
MATERIALS

Chapter
28. **Combustion and Fuels** (TC 6.10, Fuels and Combustion)
29. **Refrigerants** (TC 3.1, Refrigerants and Secondary Coolants)
30. **Thermophysical Properties of Refrigerants** (TC 3.1)
31. **Physical Properties of Secondary Coolants (Brines)** (TC 3.1)
32. **Sorbents and Desiccants** (TC 8.10, Mechanical and Desiccant Dehumidification Equipment, Heat Pipes and Components)
33. **Physical Properties of Materials** (TC 1.3)

GENERAL

Chapter
34. **Energy Resources** (TC 2.8, Building Environmental Impacts and Sustainability)
35. **Sustainability** (TC 2.8)
36. **Global Climate Change** (TC 2.5, Global Climate Change)
37. **Moisture Management in Buildings** (TC 1.12, Moisture Management in Buildings)
38. **Measurement and Instruments** (TC 1.2, Instruments and Measurements)
39. **Abbreviations and Symbols** (TC 1.6, Terminology)
40. **Units and Conversions** (TC 1.6)
41. **Codes and Standards**

Edit for Clarity and Conciseness



Section No.	Section Title	Word Count	Tables	Figures
	Introduction	354		
1	HEALTH CARE FACILITY CATEGORIES	71		
1.1.	Hospitals, Inpatient	529		
1.2.	Ambulatory, Outpatient	447		
1.3.	Residential	766		
1.4.	Regulations and Resources	1,158	1	
2	INDOOR ENVIRONMENTAL QUALITY	59		
2.1.	Infection, Disease, Contamination	865		
2.2.	Indoor Air Quality	2,746	2	1
2.3.	Thermal Comfort	684	1	1
2.4.	Acoustics	789		
3	OPERATIONS & RELIABILITY	145		
3.1.	Operations	932		
3.2.	Life Safety	350		
3.3.	Emergency Operations	1,617		
4	ENERGY USE AND PERFORMANCE	63		
4.1.	Benchmarking	206		2
4.2.	Performance	953		1
5	HVAC SYSTEM DESIGN CONSIDERATIONS	87		
5.1.	Commissioning & TAB	563		
5.2.	Medical Equipment	211	2	
5.3.	Heating Systems	262		
5.4.	Cooling Systems	319		
5.5.	Air Handling and Distribution Systems	459		
5.6.	Humidification Systems	345		1
6	HVAC DESIGN CONSIDERATIONS FOR SPECIFIC AREAS	55		
6.1.	Surgery & Critical Care	1,303		1
6.2.	Nursing	1,668		3
6.3.	Diagnostic and Treatment	817		
6.4.	Pharmacy	1,584	2	
6.5.	Ancillary	1,211		
6.6.	Sterilization and Supply	431		
6.7.	Service and Support	837		
6.8.	Dental	336		
7	STANDARDS	312		
8	REFERENCES	2,139		
9	BIBLIOGRAPHY	447		
		26,120		

Edit for Clarity and Conciseness

- Current Version: 817 words

6.3 DIAGNOSTIC AND TREATMENT

Medical diagnostic technology, systems, and equipment is continuously advancing. These systems can have multiple rooms with equipment, all with unique HVAC requirements based on the diagnostic system manufacturer. It is key to develop a strategy with the entire project team at the conceptual phase on how to manage the design requirements, recognizing that final site-specific manufacturer requirements are often not known until the project is in construction. MRI, CT, or linear accelerator manufacturers will typically not provide site specific requirements until the equipment is purchased. Heat gains from equipment can be significant and will vary by manufacturer. Some heat gain information was presented in an earlier section. Caution is advised in trying to employ a "worst-case" scenario strategy because the variations can be so significant and vary across the architectural and engineering disciplines. Consider selecting a specific manufacture and model and follow the manufactures requirements for the initial design. When the design team receives the site-specific manufacturer requirements, the changes can be reconciled with the initial design requirements and associated costs.

Treatment Rooms. Patients are brought to these rooms for special treatments (e.g., hyperbaric oxygen therapy) that cannot be conveniently administered in patient rooms. To accommodate the patient, the rooms should have independent temperature and humidity control. Temperature and humidity should correspond to those specified for patients' rooms.

Bronchoscopy, Sputum Collection, and Pentamidine Administration Procedures. These procedures have a high potential for discharges of possibly infectious droplet nuclei into the air via coughing. Bronchoscopy procedures can release airborne aerosols from a patient who could possibly be diagnosed with tuberculosis, and nontherapeutic exposures to pentamidine are an additional exposure concern. The procedures and patient recovery period (when excess haust (enclosed m.

tion designed to

elative humidity pply outlets and other occupied

ation. However, e cryogens used requirements.

iolet equipment

potential latent heat load in this area should not be overlooked. The exercise section requires no special treatment; temperature and humidity should address the thermal comfort needs. Air may be recirculated within the areas, and an odor control system is suggested.

Occupational Therapy Department. In this department, spaces for activities such as weaving, braiding, artwork, and sewing require no special ventilation treatment. Air recirculation in these areas using medium-grade filters is permissible. Larger hospitals and those specializing in rehabilitation may offer patients a greater diversity of skills to learn and craft activities, including carpentry, metalwork, plastics, photography, ceramics, and painting. The air-conditioning and ventilation requirements of the various sections should conform to normal practice for such areas and to the codes relating to them. Room temperature and humidity should be maintained within thermal comfort levels.

Inhalation Therapy Department. This department treats pulmonary and other respiratory disorders. The air must be very clean, and the area should have a positive pressure relative to adjacent areas, except when the patient may also have an airborne infection or when the treatment regimen uses hazardous drug therapies. Local exhaust ventilation controls (e.g., administration booth, enclosing hood or tent) should be provided to control exposure of staff to hazardous drug therapies.

Workrooms. Clean workrooms serve as storage and distribution centers for clean supplies and should be maintained at a positive pressure relative to the corridor. Soiled workrooms serve primarily as collection points for soiled utensils and materials. They are considered contaminated rooms and should have a negative air pressure relative to adjoining areas. Air temperature and humidity should be in the comfort range and account for protective clothing requirements required for the room occupants.

- *Restatements of Standard 170 T, RH, vent: do we need those?*
- *"Considerations": can we convert to actionable?*
- *Use of the room: keep these*
- *Explanations (why?): add/keep/clarify these*

- 411 Words

MRI, CT, and linear accelerator suites have multiple rooms with equipment. Each room's HVAC requirements are articulated by the equipment vendor. However, vendors often do not provide site-specific requirements until the equipment is ordered. Develop a plan for managing design requirements. Equipment heat gains are significant and vary by model. See heat gain information in section XX of this chapter. Select a manufacturer and model as early as possible in the design. A "worst-case" scenario design is unwise. Variations are significant. When final and site-specific requirements area available, reconcile the design to them.

Treatment Rooms. Treatment rooms in clinical departments are used for treatments that require specific equipment, which stays in the room. Provide independent temperature control for large treatment areas (>250 sq.ft) or where significant equipment loads occur.

Bronchoscopy, Sputum Collection, and Pentamidine Administration Procedures. These procedures have a high potential for dis-charges of possibly infectious droplet nuclei into the air via coughing. Ventilation is thought to protect workers from infectious aerosols possibly released during bronchoscopy procedures and to protect workers from pentamidine exposure. There is no available evidence to determine the necessary ventilation rate. One modeling study suggests that cross-contamination risk is reduced by negative pressure. (CORP2)

Imaging. Some treatments may produce odors. (ed. So what?) Specify wall penetrations which prevent radiation leakage.

Fluoroscopic, Radiographic, and Deep Therapy Rooms may require higher temperatures (e.g. 78 to 80°F {25.5 to 26.7°C} with 40 to 50%. RH). If this is the case, dedicated equipment may be needed. Provide lead lined supply and return ducts at wall penetrations to prevent radiation leakage to other occupied areas.

Magnetic Resonance Imaging (MRI) Rooms. Follow the manufacturer's recommendations for nonferrous materials and shielding penetrations.

Physical Therapy Department. Equipment heat gains are significant and vary by model.

Hydrotherapy Section. Include latent loads in load calculations.

Occupational Therapy Department. These rooms may be used for light tasks such as weaving, braiding, artwork and sewing. Larger hospitals may offer activities which are more environmentally contaminating such as carpentry, metalwork, photography, ceramics, and painting.

Inhalation Therapy Department. Provide a booth, hood, or tent to control staff exposure to hazardous drug compounds.

Workrooms. Ventilation and pressurization in soiled workrooms is thought to remove contaminants and prevent cross contamination cleaner spaces. However, available air quality observations suggest this effect is negligible; rooms on the same ventilation system typically have similar air contamination levels (Barolin). There is no available evidence (e.g. aerosol generation rates) in either space to determine ventilation needs (CORP2).

Outline Revisions

Section No.	Section Title
	Introduction
1	HEALTH CARE FACILITY CATEGORIES
1.1.	Hospitals, Inpatient
1.2.	Ambulatory, Outpatient
1.3.	Residential
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2.1.	Infection, Disease, Contamination
2.2.	Indoor Air Quality
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3.1.	Operations
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3.3.	Emergency Operations
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4.1.	Benchmarking
4.2.	Performance
5	HVAC SYSTEM DESIGN CONSIDERATIONS
5.1.	Commissioning & TAB
5.2.	Medical Equipment
5.3.	Heating Systems
5.4.	Cooling Systems
5.5.	Air Handling and Distribution Systems
5.6.	Humidification Systems
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6.1.	Surgery & Critical Care
6.2.	Nursing
6.3.	Diagnostic and Treatment
6.4.	Pharmacy
6.5.	Ancillary
6.6.	Sterilization and Supply
6.7.	Service and Support
6.8.	Dental
7	STANDARDS
8	REFERENCES
9	BIBLIOGRAPHY

This needs to include/revise to "decarb"

Dividing up some of the work

State of the known: Larry Wilson,

Infectious aerosols:

References and cleanup: Jennifer Leach

Other:

Pavel's wisdom: this is supposed to be 10k elevation. Details are in the standard and manual.
LW: top 10 questions: e.g where to duct return?
EG: from 'handbook' committee: use handbook online features. We could use online features for supplemental sections. Online sources can have other things (e.g. spreadsheets)
Cmiller: decarb;

Post meeting emails:
Granzow: consolidation of pharmacy section; help Jennifer with Ref&Cleanup
Bansali: emergency preparedness

Section No.	Section Title
	Introduction
1	HEALTH CARE FACILITY CATEGORIES
1.1.	Hospitals, Inpatient
1.2.	Ambulatory, Outpatient
1.3.	Residential
1.4.	Regulations and Resources
2	INDOOR ENVIRONMENTAL QUALITY
2.1.	Infection, Disease, Contamination
2.2.	Indoor Air Quality
2.3.	Thermal Comfort
2.4.	Acoustics
3	OPERATIONS & RELIABILITY
3.1.	Operations
3.2.	Life Safety
3.3.	Emergency Operations
4	ENERGY USE AND PERFORMANCE
4.1.	Benchmarking
4.2.	Performance
5	HVAC SYSTEM DESIGN CONSIDERATIONS
5.1.	Commissioning & TAB
5.2.	Medical Equipment
5.3.	Heating Systems
5.4.	Cooling Systems
5.5.	Air Handling and Distribution Systems
5.6.	Humidification Systems
6	HVAC DESIGN CONSIDERATIONS FOR SPECIFIC AREAS
6.1.	Surgery & Critical Care
6.2.	Nursing
6.3.	Diagnostic and Treatment
6.4.	Pharmacy
6.5.	Ancillary
6.6.	Sterilization and Supply
6.7.	Service and Support
6.8.	Dental
7	STANDARDS
8	REFERENCES
9	BIBLIOGRAPHY

- Q&A
- Next Actions
- Wrap

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Start: 2:00 PM EST by Ken Mead (acting Sub Chair)
Adjourn: 3:26 EST
Minutes added in green highlight

ASHRAE Meeting Agenda
TC 9.6 Infectious Disease Subcommittee
Indianapolis Hybrid Annual Meeting
Sunday, Jun 23, 2024
Location: JW Marriott, White River AB (1)

Virtual instructions: See MS Teams link and information below on the virtual portion of our meeting. The same link is being used for all subcommittee meetings. All times are EDT.

Join on your computer, mobile app or room device
Click here to join the meeting
Meeting ID: 228 705 876 374
Passcode: mEE5UH
Download Teams | Join on the web
Or call in (audio only)
+1 513-458-7170,,544529653# United States, Cincinnati
(888) 994-4478,,544529653# United States (Toll-free)
Phone Conference ID: 544 529 653#

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 interest. (See full Code of Ethics: https://www.ashrae.org/about/governance/code-of-ethics)

ASHRAE Commitment to Care
The health and safety of all ASHRAE conference attendees is a top priority. Out of respect for our fellow attendees, we commit to wear masks indoors, monitor our health, seek medical attention if symptoms develop and adhere to all ASHRAE Commitment to Care protocols. We are committed to the well-being of one another.

I. Introductions:
- Sign-in (https://form.jotform.com/231753647820156)

II. Guest Presentation
- "Air Transmission and Role of Ventilation in Minimizing Exposure to Pathogens by Inhalation" [copy to be placed on TC 9.6 webpage]
- Lisa M Brosseau, ScD, CIH Professor (retired) Research Consultant, University of Minnesota, Center for Infectious Disease Research and Policy

Attendance: Please document your attendance using the link below. You only need to do this one time for main TC meeting as well as all subcommittees you are also attending:
https://form.jotform.com/231753647820156

III. Subcommittee Business

- ETF Final Report – Traci Hanegan
    i. Significant work opportunities for TC 9.6 and ID Sub to continue momentum forward and investigate ongoing unknowns
    ii. Traci will coordinate with Dylan to establish "interest areas" based on topics identified in the ETF report and then TC members will have opportunity to contribute towards topics of interest

IV. ID in the News

- Respiratory Diseases
    i. Respiratory diseases, including influenza, RSV, and COVID-19, continue to pose significant public health challenges. Despite a decline in overall activity compared to last year, the prevalence of these diseases remains well above pre-pandemic levels. Notably, the season for respiratory illnesses has extended, with influenza and RSV seasons starting earlier and lasting longer. Hospitalizations for respiratory diseases are also high, particularly among young children and older adults https://bluedot.global/respiratory-disease-trends-2024-and-beyond/
    [website shared onscreen and discussed]
- Measles
    i. As of June 2024, measles outbreaks and vaccination trends are areas of ongoing concern and active management across various regions.
    ii. In the United States, CDC has reported 146 measles cases across 21 jurisdictions as of the end of May 2024. This marks a continuation of outbreaks fueled by pockets of unvaccinated populations and a decline in vaccination coverage among kindergartners, which dropped from 95.2% in 2019-2020 to 93.1% in 2022-2023.
    iii. The Illinois Department of Public Health (IDPH) recently declared an end to a significant measles outbreak in Northeast Illinois, which had reported 67 cases linked mainly to a Chicago shelter for new arrivals. The outbreak was contained through coordinated efforts among state and local health departments and the expansion of vaccination and testing capacities.
    iv. In Canada, measles cases in early 2024 have surpassed the total for all of 2023, attributed to lower vaccination rates due to COVID-19 disruptions and vaccine hesitancy.

CDC Measles Cases and Outbreaks (websites shared on screen)(https://www.cdc.gov/measles/cases-outbreaks.html)
IDPH Measles Outbreak Containment (https://dph.illinois.gov/news/2024/june/idph-declares-measles-outbreak-northeast-illinois-over.html)
Canadian Measles Update

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https://form.jotform.com/231753647820156

https://medicalxpress.com/news/2024-03-primer-measles-outbreaks-transmission-symptoms.html

v. Recent research has highlighted the critical role of ventilation in managing measles outbreaks. A study conducted in the Tocha district of southwestern Ethiopia found that poor house ventilation significantly increased the risk of measles infection. Specifically, the study indicated that individuals living in poorly ventilated homes were over three times more likely to contract measles compared to those in well-ventilated environments. This underscores the importance of proper ventilation as a preventive measure in reducing the spread of measles, especially in high-density living conditions where airborne transmission is more likely. (https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1331798/full)

- Influenza
  i. The 2023-2024 flu season has seen a significant increase in severity, particularly among children and older adults. The most commonly reported influenza viruses this season are type A(H1N1) and type B, both of which are leading to more severe outcomes among those hospitalized. CDC continues to monitor the spread and impact of these viruses through its

  A Bird-Flu Pandemic in People? Here's What It Might Look

  ii. Like.FluSurv-NET system
  iii. Traditional ventilation systems, particularly in high-risk environments like operating rooms, have been found to inadvertently circulate airborne pathogens, increasing the risk of infection. Studies emphasize the need for improved ventilation designs that can adapt to different scenarios to reduce airborne transmission risks https://medicalxpress.com/news/2024-02-potential-flaw-room-ventilation-covid.html
  iv. Additionally, research has shown that low humidity levels, often resulting from excessive ventilation, can enhance the viability of airborne viruses. Maintaining indoor humidity between 40% to 60% can reduce the spread of these viruses by increasing the formation of reactive oxygen species in water droplets, which have disinfectant properties https://medicalxpress.com/news/2024-03-humidity-boon-viruses-excess-ventilation.html
  Persons interested in joining the RH in healthcare discussion are encouraged to reach out to Jonathan Flannery who is leading a workgroup on this topic for SSPC170.
  v. *A Bird-Flu Pandemic in People? Here's What It Might Look Like* (NY Times)- A Bird-Flu Pandemic in People? Here's What It Might Look Like. - The New York Times (nytimes.com)

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-currently few human cases and symptoms have been mild but significance in how this strain has jumped to multiple other species (cows, birds, cats, …) and often with devastating consequences is a alarming. Previous variants of H5N1 in China was moderately more easily spread to humans and with more serious consequences than that observed thus far with current variant.

Open mic Comment: (Kathy Warye-IP and former chair of APIC): Observations re: witnessed aerobiologist challenges getting their message to ID docs during COVID-19 pandemic. Time to think proactively - more outreach to IDSA, APIC – emphasize greater collaboration so as to accelerate collaboration.

Attendance: Please document your attendance using the link below. You only need to do this one time for main TC meeting as well as all subcommittees you are also attending:
https://form.jotform.com/231753647820156

TC9.6 / 170 Research Sub-Committee

June 23, 2024

- Welcome!
- 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 interest.*
  - See full Code of Ethics: https://www.ashrae.org/about/governance/code-of-ethics
- Sign-in sheet for in-person; virtual link: https://form.jotform.com/231753647820156
- Introductions
  - David Thomsen; david.thomsen@providence.org
  - Ken Mead; kmc3@cdc.gov
  - Brendon Burley; brendon.burley@gmail.com
  - Room round-table
- *In-person: please find microphone and introduce before speaking*

Agenda

- 1955 Presentation
- Ongoing Research Reports
  - Research Projects (RP)
  - Approved Projects (TRP)
- Developing Research Reports
  - Work Statement (WS)
  - Research Topic Acceptance Request (RTAR)
  - Potential RTAR
  - Publication Topic Acceptance Request (PTAR)
- Other Research
- Open Floor
- Appendix
  - Links to home page and books store, flow chart of ASHRAE research process

Work Statement

- 1955 WS: Anteroom ventilation rate, temperature range, pressure relationship, and boundary conditions
  - Ted, Ehsan, Erick
  - Addressing comments
  - Update/presentation - Ted

Ongoing Research Reports

RP-1854: Database of Ultraviolet Inactivation Rate Constants (k-values) for Microorganisms Critical to System Design

- Lead TC 2.9: Steve Martin; TC9.6 Lead: Dylan Neu, Ken Mead
- Research Objective: Literature review and development of a comprehensive and standardized database of UV rate constants (susceptibility to UV) of various micro-organisms in air and surfaces in the built environment.
  - Literature review complete
  - Final report delivered; manuscript for Journal also submitted
  - PMS meeting to conclude project.
  - Update – Ken, Dylan

RP-1816: Reporting the Energy Use and Heat Gain from Imaging Equipment

- Lead TC9.6: Oscar Cobb PMS Chair; TC4.1 and TC4.7 Co-sponsored
- Research Objective: This research will determine heat gain and energy use for large, often multi-component, imaging systems in the field. Results will be used to update and expand current data in multiple ASHRAE publications. It will also provide energy use metrics for energy modeling and medical equipment comparisons in HVAC designs.
  - Underway, coordinating with hospitals and manufacturers to complete data acquisition
  - Presentation – Jim/Jacquelyn/Walt

RP 1889: Graywater use in Healthcare Facilities; determining risk and appropriate design responses

- Lead 189.3: ; TC9.6 Lead: Erica Eskins, Eric Granzow, Tyler Anderson
- Research Objective: Determine if any negative impacts to patient safety may exist from use of non-potable water.
  - Awarded
  - Update - Eric/Erica/Tyler

RP 1864: Investigating the applicability of Standard 62.1's Ventilation Rate Procedure for Healthcare Rooms

- TC9.6 Lead: Paul Ninomura; Co-Sponsor: SSPC 170, 62.1
- Team – Paul, Ken, Kathleen, Alejandro, Arun, Abdel
- Research Objective: ASHRAE Standards 62.1 and 170 seek to provide safe and acceptable indoor environments yet they employ very different approaches. This research investigates if/where the design flexibility in Standard 62.1's Ventilation Rate Procedure could be an appropriate and energy-conserving alternative to Standard 170's prescriptive air-change-per-hour approach to outdoor air ventilation requirements.
  - Vendor onboard!
  - Update – Austin / Ken

RP 1928: Air Cleaner Efficiency in Combination Chamber Duct System

- Lead TC 2.9: Chrystal Jolliffe; TC9.6 Lead: Linda Lee
- Research Objective: Improving test methods to measure air cleaner performance against airborne pathogens.
  - TC9.6 co-sponsorship approved.
  - RAC accepted with comments in February 2023
  - Voting to co-sponsor approved
  - Awarded to LMS, work just beginning
  - Update - Chrystal

Tentative Research Reports

Developing Research Reports

WS 1936: Evaluating the relationship of air change rate (ACR) and ventilation performance in laboratories, clean rooms, and industrial spaces

- ACR MTG led
- Price Industries has agreed to co-fund
- Still in WS development – planning to finish soon
- Looking for potential bidders
- Update - Kishor, Roger, Roland

1931 WS: Determination of the Metabolic Rates and CO2 and Aerosol Generation of Occupants in Offices, Medical Settings and Commercial Kitchens

- TC2.1 Lead: Meng; TC9.6 Lead: Sierra
- Co-Sponsor with TC2.1, TC 2.3, 2.4, 5.10, 9.6 and SSPC 55
- Approved for WS
- No update at this time, hoping for end of the year
- Update – Sierra/Meng

RTAR

RTAR

- Empty!!!

Potential RTAR

Potential RTAR - Priority

- XXXX RTAR: Patient Bathroom ventilation needs
  - To gain insight on the following research questions:
    - Are there ventilation rates, diffuser placements, or other ventilation measures which markedly reduce the aerosol plume phenomena?
    - How long after use should restroom exhaust fans run, under different ventilation scenarios, to achieve a sufficient reduction in bioaerosols?
      - Ken/Travis/Larry/Arup
      - Several meetings have occurred
      - Toilet plumes highlighted at ID subcommittee meeting
      - Travis started draft RTAR, Larry provided updated version
      - Update – Larry

Potential RTAR

- XXXX RTAR: Infectious Aerosols PD Ventilation Interventions
  - Update – Walt

Strategy	Quality of Evidence	Indirect Evidence	Magnitude of Benefit	Life Cycle Cost	Energy and Carbon	Strength of Recommendation
Natural Ventilation	Low	High	Moderate	Low	Low	Strong
Mechanical Ventilation	Low	High	High	High	High	Strong
Filtration	Moderate	High	Moderate	Moderate	High	Recommendation
UVGI	Moderate	High	Moderate	High	Moderate	Conditional
Air Cleaning	None	Low	Low	High	Moderate	Weak
Airflow Patterns	Moderate	High	High	Moderate	Low	Recommendation
Humidity Control	None	Low	Low	High	High	Weak

Potential RTAR

- XXXX RTAR: Ventilation for Dental Spaces
  - Paul has team in place working to define need
  - Update – Paul

Potential RTAR - Priority

- XXXX RTAR: Understanding the appropriate application of humidity and temperature control strategies across climate zones on infectious aerosol transmission
  - Standard 170 Work Group ongoing.
  - Research need will be defined by result, anticipated Summer 2024
  - Update - Jonathan

Potential RTAR - Priority

- XXXX RTAR: Risks Associated with different medical practices (clinic, MOB, hospital)
  - Potential overlap with 1864, consider waiting for 1864 to mature more prior to finalizing focus
  - FGI meeting – Michael/Jeremy/Jonathan
  - AHA data/research center – J. Flannery in May
    - Risk differences (occupational unlikely; HAI more likely)
    - Service-type (i.e. outpatient vs inpatient procedure)
    - Sick vs well areas
  - Update – ?

Other

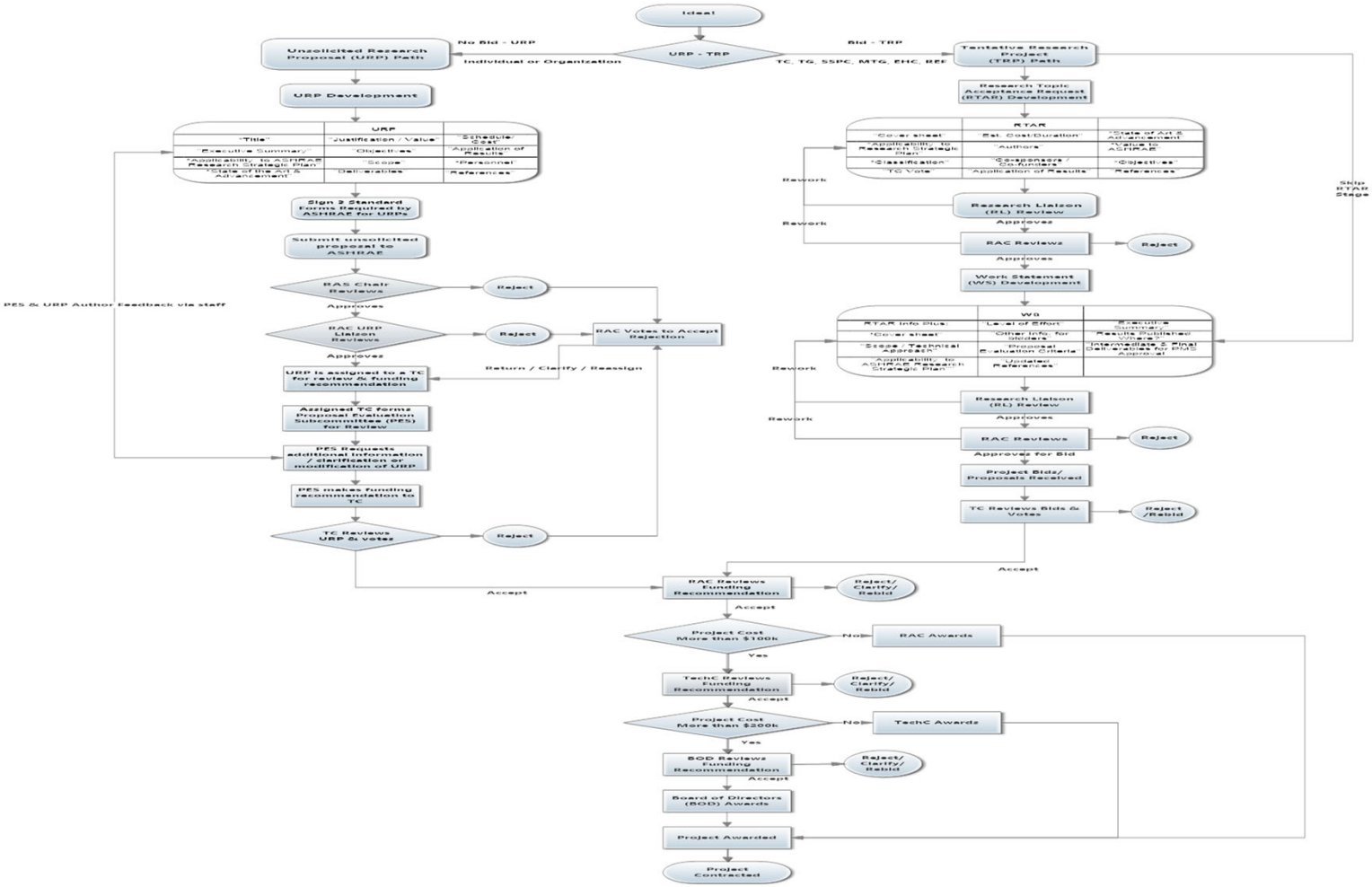
Other Research Efforts

- Big Data Operating Room Air Change Analysis
  - Team - Ehsan, Fred
  - Recommendation from CO-RP3
  - Utilizing public SSI data and air balance reports
  - Pilot complete
  - Change proposals issued to S170
  - Investigating funding, other sources (ASHRAE not prime)

Open Discussion

Appendix

- ASHRAE Research Home page –
  - https://www.ashrae.org/technical-resources/research
- Purchase Research Reports –
  - https://www.techstreet.com/ashrae/subgroups/34748?ashrae_auth_token=
- Research Flowchart (next slide) –


Ideas!
URP - TRP
No Bid - URP
Individual or Organization
Unsolicited Research Proposal (URP) Path
Bid - TRP
TC, TG, SSPC, MTG, EHC, REF
Tentative Research Project (TRP) Path
URP Development
URP
"Title"
"Justification / Value"
"Schedule/ Cost"
"Executive Summary"
Objectives
Application of Results
"Applicability to ASHRAE Research Strategic Plan"
"Scope"
"Personnel"
"State of the Art & Advancement"
Deliverables
References
Sign 3 Standard Forms Required by ASHRAE for URPs
Submit unsolicited proposal to ASHRAE
RAS Chair Reviews
Reject
Approves
PES & URP Author Feedback via staff
RAC URP Liaison Reviews
Reject
RAC Votes to Accept Rejection
Approves
Return / Clarify / Reassign
URP is assigned to a TC for review & funding recommendation
Assigned TC forms Proposal Evaluation Subcommittee (PES) for Review
PES Requests additional information / clarification or modification of URP
PES makes funding recommendation to TC
TC Reviews URP & votes
Reject
Accept
Research Topic Acceptance Request (RTAR) Development
RTAR
"Cover sheet"
Est. Cost/Duration"
"State of Art & Advancement"
"Applicability to Research Strategic Plan"
"Authors"
"Value to ASHRAE"
"Classification"
"Scope"
"Objectives"
TC Vote"
"Cosponsors / Co-funders"
"Application of Results"
"References"
Rework
Research Liaison (RL) Review
Approves
RAC Reviews
Reject
Approves
Work Statement (WS) Development
WD
RTAR Info Plus:
"Level of Effort"
"Executive Summary"
"Cover sheet"
Other Info. for Readers
Results Published / Cited
"Scope / Technical Approach"
Proposal Evaluation Criteria
Internal/Late & Final Deliverables for PMS Approval
"Applicability to ASHRAE Research Strategic Plan"
Updated References"
Rework
Research Liaison (RL) Review
Approves
BAC Reviews
Reject
Approves for Bid
Project Bids/ Proposals Received
TC Reviews Bids & Votes
Reject /Rebid
Accept
Skip RTAR Stage
RAC Reviews Funding Recommendation
Reject/ Clarify/ Rebid
Accept
Project Cost More than $100k
No
RAC Awards
Yes
TechC Reviews Funding Recommendation
Reject/ Clarify/ Rebid
Accept
Project Cost More than $200k
No
TechC Awards
Yes
BOD Reviews Funding Recommendation
Reject/ Clarify/ Rebid
Accept
Board of Directors (BOD) Awards
Project Awarded
Project Contracted

Proposed SSPC 170 and TC9.6 priorities

- The Impact of Recirculated Air on Total Air Change Requirements
  - Ken Mead, Jonathan Flannery, Robert Booth, Sarah Clock, Russ Olmstead to define IP
- Risks assessments associated with different healthcare settings – what is concern and what would answer do?
- Understanding appropriate application of humidity and temperature – (awaiting 170 workgroup efforts, will be led by Jonathan)
- Patient Bathroom Ventilation Design – Larry, Travis; Ken
- Anteroom Ventilation Design – responding to RAC comments
- ~~Outside Air Percentage Reduction – included as outcome of 1864~~
- ~~Recirculation efficiency in reducing energy consumption compared to infection transmission costs – submitted to RAC~~
- ~~HEPA Recirculation in lieu of total air change rate in patient room - ?~~
- ~~UV light in lieu of total air change rate in patient room - no~~

SSPC 170 and TC9.6 – working slide

- Understanding appropriate application of humidity and temperature – Jonathan
  - JF to schedule meeting following 170 mtg
  - End in mind - Guidance to 170: more spaces, higher floor?
- ~~Recirculation efficiency in reducing energy consumption compared to infection transmission costs – feedback from RAC received~~
- Anteroom Ventilation Design – feedback from RAC received; underway
- Patient Bathroom Ventilation Design – need a partner with Ken?
- Risks associated with different levels of care (hospital, rehab hospital, outpatient, residential)
  - hospitals vs rehab (return rate, length of stay, financial) – JF to investigate AHA, FGI,
  - Outpatient urgent care waiting vs inpatient ed waiting
- Outside Air Delivery requirements – included as outcome of 1864
- ~~HEPA Recirculation in lieu of total air change rate in patient room~~
- ~~UV light in lieu of total air change rate in patient room~~
- Understanding total air changes (hold until 241 outcome – equivalent outdoor air)

Potential RTAR - no

- XXXX RTAR: Source Capture - Ventilated headboard
  - NIOSH study relative to PACU
  - Efficacy of “headboard” (i.e. tent, kp, cdc, etc.)
  - Definition of headboard – appendix (Eric)
  - AII room; “middle” room – air precautions room
  - HICPAC standards to CDC - https://www.cdc.gov/hicpac/index.html
  - Update – Roger, Ken, Dylan, Paul, Sonia,