ASHRAE VIRTUAL WINTER CONFERENCE

February 9-11, 2021

Live Sessions

Tuesday, February 9, 10:30 AM - 11:30 AM

Seminar 1 (Intermediate)

What's in your Toolkit? Laboratory Efficiency for Cutting Edge Labs

Track: Energy Conservation

Sponsor: 9.10 Laboratory Systems

Chair: Jason Atkisson, P.E., Member, Affiliated Engineers, Inc., Madison, WI

Cutting-edge research often hosts hazards that must be contained effectively to maintain a safe work environment for researchers. As a result, laboratories are complex buildings that can be challenging and costly to operate correctly, typically consuming up to ten times more energy than similar-sized commercial buildings. To guide stakeholders in research facilities to enhance energy efficiency and safety of indoor environments in new or existing laboratories, the Smart Labs Toolkit, the application of risk-based ventilation and an example program with best practices is presented.

1. Smart Labs Toolkit: A Guide to Enable Labs of the Future

Rachel Romero, P.E., Member*, National Renewable Energy Laboratory, Golden, CO*

Smart Labs enable safe and efficient world class science to occur in laboratories through high-performance methods. A Smart Labs program employs a combination of physical, administrative and management techniques to assess, optimize, manage and maintain high performance laboratories. Attendees will walk away from the presentation with a framework for building a successful program based on the Smart Labs Toolkit to start improving lab facilities to operate cost-effectively, increase flexibility and dependability, improve safety and enhance energy efficiency.

2. How Occupant Demand for Ventilation Drives Safety and Efficiency in Smart Labs

Thomas Smith, Member*, 3Flow, Cary, NC*

Smart Labs strive to promote research success, ensure safety and minimize energy consumption. The airflow systems, as the primary safety method, are the largest energy consumers in the majority of labs. Understanding the demand for ventilation enables the most efficient and effective design and operation of systems. The demand for ventilation is a function of safety risk, the control of conditions that satisfies lab occupancy and system utilization requirements. This presentation focuses on how to assess the demand for ventilation in labs and translate those requirements to design and operating specifications that enable safe, efficient and sustainable Smart Labs.

3. Argonne's Journey to Smart Labs: Integrating Safety, Sustainability and Operations

Catherine Hurley, P.E.*, Argonne National Laboratory, Lemont, IL*

Argonne's Smart Labs Program is optimizing laboratory operations to achieve energy efficiency, provide safe ventilation levels, and optimize space functionality. An integrated team from safety, facilities, research and sustainability are collaborating to optimize 1 million gsf across 6 lBA. The goal: enhance safety and operations with a 20% energy reduction in 10 years. This presentation provides lessons learned in launching a Smart Labs program by leveraging existing resources and developing new partnerships. Results are presented on implementation at Argonne first two focus facilities and how data analytics is being leveraged in the program.

Tuesday, February 9, 1:30 PM - 2:30 PM
Seminar 6 (Basic)

Fighting the Unseen Killers: Gas-Phase Air Cleaners

Track: HVAC&R Fundamentals and Applications

Sponsor: 2.3 Gaseous Air Contaminants and Gas Contaminant Removal Equipment

Chair: Kyung-Ju Choi, Ph.D., Member, Clean & Science, Louisville, KY

Gaseous contaminants such as formaldehyde, radon, odor, COx, NOx, SOx, O3, VOCs, SVOCs damage the environment and human health. Filtration has a critical role in mitigating such damage. This seminar explains how gas-phase air cleaners work in filtering harmful contaminants.

1. How Do I Get Rid of All That Stuff in My Air?

***Matt Middlebrooks**, Filtration Group, Dallas, TX*

This presentation proposes a series of questions, both objective and subjective, that can narrow down the myriad choices available and simplify the task of identifying a solution for a given situation. The speaker also provides an overview of the different gas-phase air cleaner formats that could be used to address the IAQ concerns, along with pros and cons for each. Finally, the presentation discusses current test methods that can be used to confirm a specific device will address the need.

2. What's in My Air? Can My Air Cleaner Help Me?

***Kathleen Owen, Fellow ASHRAE**, Owen Air Filtration Consulting, Cary, NC*

With so many different contaminants in the air, it is difficult to imagine that we could breathe clean air. With gas-phase air cleaners increasing in use and in the types available, we need to remember why they are important to our IAQ. This talk goes back to basics by covering what is in the air, where does it come from, what is inside and outside, does it change by building, season, and time of day. Knowing what is or might be in our air, we need to consider basic health effects, and non-human issues such as damage to equipment.

3. What Is in My Gas Phase Filter and Why?

***Paula Levasseur, Member**, Cameron Great Lakes, Portland, OR*

An overview of the types of adsorbent, chemisorbent and catalytic media used in gas phase filters today is described. There is a wide selection of media some of which overlap and deeper knowledge of each media ability to remove various compounds and the method each type of media uses is an important factor in proper media selection. Knowledge of the environmental conditions under which these media best perform is addressed along with the advantages and disadvantages of the varying technologies. This is the first step in helping you choose the proper gas phase media for your filter.

Wednesday, February 10, 10:30 AM - 11:30 AM
Seminar 14 (Basic)

What You Need to Know About ANSI/ASHRAE Standard 90.4: *The Energy Standard for Data Centers*

Track: Standards, Guidelines and Codes

Sponsor: 9.9 Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment, SSPC 90.4, SSPC 90.1

Chair: Robert McFarlane, Member, Shen Milsom & Wilke, LLC, New York, OR

The 2019 version of Standard 90.4 was officially recognized in Standard 90.1 as the Alternate Compliance Path for Data Centers, defined as greater than 10 kW and 20 W/sf power density. Smaller facilities are defined as Computer Rooms and remain governed by Std. 90.1. Standard 90.4 has already been adopted in the state of Washington and is pending adoption in other jurisdictions. It will be widely recognized as Std. 90.1-2019 is adopted, so it is important that designers understand its substantial differences from 90.1 and the advantages it offers for achieving compliance in Mission Critical Data Center designs.

1. The Origin of ANSI/ASHRAE Std. 90.4, Its Purpose and Format and Using the Electrical Loss Component (ELC) Metric

***Robert McFarlane, Member**, Shen Milsom & Wilke, LLC, New York, OR*

The 90.4 Standard grew out of industry demand for a non-prescriptive way of demonstrating energy efficiency without potentially jeopardizing the reliability of these mission critical facilities – particularly since the industry has made enormous strides in energy efficiency without codified mandates. But existing, recognized metrics are based on actual operating measurements, which cannot be predicted with sufficient accuracy in the design stage, so new metrics had to be developed that enabled designers to demonstrate compliance in a reasonably easy way. The ELC, or Electrical Loss Component is one of those metrics.

2. Understanding the Mechanical Load Component (MLC) and Tradeoff Options in ANSI/ASHRAE Std. 90.4

***Vali Sorell, P.E., Member**, Microsoft Corporation, Charlotte, NC*

The radically different operating parameters in data centers render energy modeling programs in common usage inapplicable without inordinate manipulation. This required a new metric to demonstrate mechanical system efficiency. The MLC, or Mechanical Load Component, is computed from five different values which are readily available to the design engineer. But if

either the mechanical or electrical one system is replaced without the other, and the legacy system does not meet the 90.4 Standard on its own, the designer is allowed to compute tradeoffs between the MLC and ELC to demonstrate overall compliance.

3. The Relationship between Standards 90.1 and 90.4, and the Importance of 90.4 to Mission Critical Facilities

***Timothy Peglow, P.E., Member**, MD Anderson, Houston, TX*

The 90.4 Standard is intended for "real" data centers, with no intent for small computing rooms inside large buildings to circumvent 90.1 requirements. A great deal of effort between the two committees resulted common definitions of Data Centers and Computer Rooms, with the mission critical nature of the former recognized in the 2019 version of 90.1 by incorporation of the 90.4 Standard as an alternate compliance path. The importance of this to mission critical facilities, like those in the health care and financial industries, cannot be overstated.

Wednesday, February 10, 12:00 PM - 1:00 PM
Debate 1 (Intermediate)

Is Air Change per Hour (h^{-1}), cfm/ft^2 or Something Else?

Track: HVAC&R Fundamentals and Applications

Sponsor: MTG.ACR, 9.11 Clean Spaces, TC9.6, TC 9.10, and EHC

Chair: Kishor Khankari, Ph.D., Fellow ASHRAE, AnSight LLC, Ann Arbor, MI, James Bennett, Ph.D., Member, CDC/NIOSH, Cincinnati, OH, Joe Zulovich, Ph.D., P.E., Affiliate, University of Missouri, Columbia, MO, Travis English, P.E., Member, Kaiser Permanente, Anaheim, CA and Dan Koenigshofer, P.E., Member, Dewberry, Chapel Hill, NC

Ventilation airflow requirements are specified in standards, codes and design guidelines in terms of Air changes per hour (h^{-1}), cfm/ft^2, cfm/person, etc. Quantity of supply airflow rate depends on such specification. A group of people who support air change rate thinks it has been working successfully from several decades in making the critical spaces safe, comfortable and healthy. Another group thinks this legacy practice has a little scientific basis and is a burden on energy efficiency and cost of operation of HVAC systems. This session is an open debate on this issue. Active participation is required from the attendees.

Thursday, February 11, 10:00 AM - 11:30 AM
Seminar 27 (Intermediate)

MERV 13, HEPA and UVC: What Did Buildings Do During this Pandemic, and How to Make your Buildings More Resilient for the Next Outbreak

Track: Environmental Health Through IEQ

Sponsor: 2.9 Ultraviolet Air and Surface Treatment, 2.10 Resilience and Security

Chair: Jason DeGraw, Ph.D., Member, Oak Ridge National Laboratory, Oak Ridge, TN

ASHRAE buildings have been implementing changes to their ventilation systems based on many different recommendations including the ASHRAE Position Document on Infectious Aerosols and the recommendations of the ASHRAE Epidemic Task Force. This seminar focuses on the two main strategies implemented by buildings: Merv13 Filtration & UVC (Ultraviolet Light) systems as recommended by the ASHRAE Position Document. The seminar also presents the current recommendations by the Chair of the ASHRAE Epidemic Task Force.

1. Why MERV 13 and NOT HEPA Filtration

***Kathleen Owen, Fellow ASHRAE**, Owen Air Filtration Consulting, Cary, NC*

MERV 13 has been the most widely used strategy to upgrade buildings during the COVID-19 pandemic. Why is this the case and why haven't buildings implemented other filtration strategies like HEPA filtration.

2. UVC: How to Do It: Design and Installation

***Scott Sherwood, Member**, Eco-Care Corporation, Bronx, NY*

UVC must be designed and installed properly to provide the buildings ventilation system with the highest potential to reduce the level of infectious contamination. What are the design parameters and how should UVC be installed so that it meets the ASHRAE standards and recommendations in the ASHRAE handbook chapter.

3. The Evolving State of COVID-19 HVAC Guidance: What Have We Learned, Where Are We Now, Where Are We Headed?

***William Bahnfleth, Ph.D., P.E., Presidential Fellow ASHRAE**, Penn State, University Park, PA*

When the significance of the COVID-19 pandemic became apparent, ASHRAE was called on to provide immediate guidance on HVAC-related measures to mitigate infection risk. As understanding of the characteristics of COVID-198 transmission and of the consequences of available control measures have become clearer, it has been necessary to refine many of the initial recommendations, mainly from the perspective of achieving desired levels of protection with due consideration to energy use and economic constraints. This presentation summarizes the evolution of ASHRAE COVID-19 guidance to date and the directions in which it is likely to evolve.

Thursday, February 11, 1:30 PM - 2:30 PM
Workshop 2 (Basic)

Best Practices of the Mentor-Mentee Relationship

Track: HVAC&R Fundamentals and Applications

Sponsor: YEA Committee, College of Fellows

Chair: Jessica Errett, P.E., Member, Energy Studio, Inc, Omaha, NE

Mentoring can be a powerful resource for personal and professional growth, not only for mentees, but for mentors as well. Are you working through a challenging new project or moving into a new role? ASHRAE members at any stage of their career will benefit from this interactive workshop. Mentorship does not just happen; it's important to be intentional about finding and nurturing relationships, both with those that fill experience gaps, but also with peers to achieve your highest potential. It's the goal of this workshop to organically connect members to develop their skills, knowledge and confidence to enhance attendees' growth.

1. Growth through Learning Inc.

***Ralph Kison, Member**, Growth Through Learning Inc., Vancouver, BC, Canada*