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9:00 am – 9:45 am

**Laboratory HEPA Filter Systems: Innovation Reducing Risk and Total Cost of Operations**

*Arthur Soma, Steven Devine, Phillip Chearmonte, Camfil Farr Inc.*

As the technological capability of laboratories continues to improve, so do the demands for cost effective construction, facility utilization uptime, and low operating costs. Requirements for HEPA filtration span a wide range of technology and applications including biosafety, nuclear, pharmaceutical, medical and engineered nanoparticles. Challenges include large production facility design, mechanical room space constraints, extreme environmental operating conditions, regulatory compliance, expandability, and 24/7 uptime requirements. The innovative integration of all functional components of a HEPA filter containment barrier system has resulted in a new approach across product platforms that is easier to install, commission, validate, certify, upgrade, and proactively maintain than traditional systems while reducing the Total Cost of Ownership. Certain unique and validated design developments allow for non-intrusive operation including in-situ filter integrity testing and space decontamination allowing for risk reduction and simplified operation to be considered in the planning stages of a new laboratory facility.

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9:45 am – 10:30 am

**HEPA Filtration for Controlled Environments**

*Kevin Delahunt, CAFS, BGE Service and Supply*

*Brenda Wellington, BGE Service and Supply*

*Ken Barkley, Biolab Air Quality Services, a division of BGE Service and Supply*

The High Efficiency Particulate Air Filter (HEPA) filter provides the essential particulate removal performance for critical controlled environments. They are used on the supply side to meet stringent clean room classifications, for protection of product and personnel in biosafety cabinetry, and on contaminated exhaust to protect the environment. The current micro-glass filters have been the standard for over 40 years. Newer medias such as PTFE (polytetrafluorethylene) are now available offering lower differential pressure and therefore, lower energy and operating costs.

This presentation will review the history of the HEPA filter, system design, operation and maintenance, in-situ testing, and an introduction to PTFE.

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11:00 am – 11:45 am

**Acoustics, Noise and Vibration Issues in Laboratory Design**

*Russ Lewis, P. Eng., Project Director, RWDI*

Dealing effectively with acoustics, noise and vibration issues is critical to the successful functioning of modern laboratories. Labs must be adequately isolated from exterior noise sources, and must have sufficiently quiet ventilation systems, including fume hoods and biological safety cabinets, to provide users with adequate speech intelligibility, and freedom from irritating background noise conditions. In addition, sensitive laboratory equipment such as scanning electron microscopes, often have stringent manufacturers' operating requirements for the maximum noise levels to which they may be exposed. Laboratories used for teaching and demonstration have additional design issues related to speech intelligibility and ease of communication. Achieving these design goals is possible through careful attention to mechanical system design, partition selection, acoustical finishes, and facility layout.

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The amount of vibration-sensitive equipment used in laboratories, research institutions and hospitals is rapidly increasing; vibration is a growing issue in the location and design of such facilities. Vibration can also be an important consideration from a human comfort perspective in the workplace.

Vibration issues may be from environmental sources (road, rail, industry) or internally generated by building services (e.g., mechanical systems) and footfalls. Requirements for stringent vibration controls are prevalent in medicine, nanotechnology, micro-electronics, bio-technology, and other research and imaging fields. This presentation will explore typical vibration issues and solutions in a variety of laboratory and research settings, explaining criteria, design objectives and solutions.

Attention to appropriate design practices for acoustics, noise and vibration can eliminate costly design mistakes or post-construction mitigation, especially when incorporated at the beginning of the design process. By following some typical design strategies for such issues, designers can create spaces that function effectively, support intended equipment and procedures, and provide a comfortable and productive environment for end users.

Practical aspects of the above issues will be discussed in detail, and exemplified by selected projects that RWDI has recently completed. The presentation will also deal with issues of cost and coordination with other aspects of building design, construction and operation. RWDI has developed acoustics, noise, vibration and ventilation guidance documents for use by institutions in addressing these issues in their development of laboratory spaces. This presentation will draw on these resources to clearly explain effective approaches to acoustics and noise issues in laboratory design.

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11:45 am – 12:30 pm

**Evaluation of Existing Laboratory Facilities via Re-Commissioning**

*Marshall Mormyluk, Controls & Commissioning Specialist, Hemisphere Engineering Inc.*

Successful modernization of a laboratory requires a clear, detailed roadmap connecting the configuration of existing building systems with the current and anticipated future needs of the facility. This presentation demonstrates how the re-commissioning process can be employed to reveal shortcomings in existing systems and navigate the roadmap to the renovations required to meet relevant standards.

One key approach to improvement has been through building controls. There has been a steady evolution in controls for laboratories over the past two decades, from pneumatics to direct digital controls (DDC) to more sophisticated end devices. Such end devices have provided better ways to maintain directional airflow, space pressurization, temperature and humidity.