Next Generation Energy Saving Fume Hood Technology

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The laboratory design community has long recognized the chemical fume hood as the researcher's first line of defense against toxic vapors generated during their day to day lab procedures. However, as much as it is a defender of the laboratory technician's health and safety, the unwanted side effect of polluting the atmosphere and wasting huge amounts of energy plagued the industry until just a few short years ago. Until then it seemed that safety and energy reduction/pollution were mutually exclusive.

It has been almost 10 years since Lawrence Berkeley National Labs released their report titled, "Energy Use and Savings Potential for Laboratory Fume Hoods. In that report they stated that in the average climate the typical fume hood consumed as much energy as three averaged sized homes. The report suggested that if fume hood design strategies (reduction in face velocity) were used in all new construction it could generate savings of 75% or $1.5 billion. Manufacturers set out to improve their ducted hood designs with moderate success; something closer to 40%. Ducted hoods not only fell short of the 75% target but the market, even now 10 years later, does not fully embrace the concept of 60 FPM. Just read CalOSHA 5154.1 to understand what I mean. In 2003 the LBNL report estimated that the existing stock of operating fume hoods in the US was somewhere between 500,000 and 1,500,000 units. Using a conservative average of 750,000 the report estimated that the annual operating cost for US hoods was approximately $4.2 billion. Considering the report is now nearly 10 years old and ducted hoods operate only modestly better today, applying inflation results in very formidable numbers. The values are striking enough for one to search for a better solution. Furthermore, as added data for consideration, a recent report published by Egnaton, the European association for sustainable laboratories, has demonstrated that fume hoods in Europe consume more than 1.7 billion Euros worth of energy each year. The report states that this figure will most likely keep on rising as the price of energy continues to increase.

Lab air is not recirculated by the mechanical system either to the lab or any other adjacencies. Sizing HVAC systems to meet the huge CFM demands of chemical fume hoods results in air change rates which are far greater than those necessary to satisfy clean air requirements or fresh air for lab occupants. Considering the high percentage of fossil fuel used in generating electricity in the US and the resulting tons of CO_2 it becomes abundantly clear that a more comprehensive and effective global solution to achieve green buildings is needed.

Green Fumehood Technology

GreenFumehood (GFH) Technology is the solution developed by Erlab, who has specialized in fume hood filtration since 1968. It is an autonomous system which replaces and/or downsizes many components of the mechanical infrastructure. The resulting system saves on first costs, it protects the atmosphere and dramatically reduces the energy necessary to effectively ventilate the workplace and assure the health and safety of the lab personnel. The new filtration media called Neutrodine enables lab techs to simultaneously perform multidisciplinary tasks involving acids, solvents and bases in liquid or powder form. This filter is capable of handling the majority of all chemicals used in today's laboratories.

GFH also features remote communication software—developed with Microsoft technologies—to provide management capabilities for a network of up to 250 fume hoods in real time. It is a standalone technology that allows the design of a new laboratory without excessive use of complex and expensive building mechanical systems. The filtered air technology enables labs to save money with regards to the lab ventilation system and with the benefit of a modular and mobile solution.

This new technology has been extensively tested and is now in use at numerous universities, private companies, research centers, and third party test labs who have concluded that Green Fume Hood Technology is a viable alternative to ducted fume hood.

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