Fume Hood Findings

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What lab or research facility would be complete without a fume hood? These ubiquitous pieces of equipment along with their lab partners — biological safety cabinets and casework — have been mainstays for all types of research work for decades. To find out how technology and recent trends have impacted these products, Pharmaceutical Processing spoke to several industry experts.

Considerations in Size, Construction & Portability

Research companies want flexibility; they also want the latest in advanced materials for their lab equipment.

According to Brandon Howell, Marketing Manager at AirClean Systems, high-end thermoplastics, such as polypropylene, are used for the construction of their ductless and exhaust fume hoods. “Seamless thermally-welded polypropylene is resistant to most commonly used laboratory chemicals, and will not rust like a traditional metal enclosure. For our smaller mobile workstations, we utilize a variety of clear plastics, depending on the process being performed in the enclosure.”

According to Terry Thompson, NuAire’s PolyPro Sales Manager, “The unique thing about our products is that all of them are made of polypropylene — normal fume hoods are made of steel — normal casework is either made of wood or steel. The reason why we went to polypropylene is mainly for really corrosive environments.”

“We are currently seeing some manufacturers that are coming out with fume hoods that are plastic on the inside and out,” says Labconco’s Luke Savage. “Polypropylene is becoming more prevalent with a lot of manufacturers. Where it really counts is on the interior of the fume hood. A lot of the liner materials have become standardized so there really haven’t been any major trends. A lot of those liner materials are the same materials we have been using for the past decade. Chemical compatibility has to be appropriate for the types of chemistry that is taking place in side.”

Fume hood and cabinet sizes have come under scrutiny as well, as Howell explains. “Lab managers are faced with ever-shrinking laboratory space, so they need to squeez e every square inch out of the work area. The key is to find a happy medium between working space, floor/counter footprint and enclosure height. The option to choose from a variety of enclosure sizes is key.”

Savage is also seeing this trend, “There are a lot of small enclosures that have taken the place of full fledged “built-into the building" type fume hoods. Things are getting smaller where appropriate and we are seeing mobility in the form of ductless type enclosures.”

For portability and space savings — sometimes the right way to go is with a ductless fume hood

“We see a lot of customers that need ‘just a few more feet’ of workspace for semi-frequent use,” says Howell. “We also see customers that have been saddled with older lab space that does not fit their needs. In these cases a ductless workstation or hood can be utilized to provide fume containment where and when it is needed, instead of being tied to a single exhaust hood on the wrong side of the room or building.”

Energy Efficiency

Fume hoods use a lot of air to do their jobs correctly. Moving a lot of air through the fume hood is key to operator safety. Unfortunately moving so much air is costly. Not only is moving the air costly — but sometimes the air itself can be expensive. Heated or cooled air is costly — and wasteful when it is just going through a fume hood and outside. However, new technologies are being developed to make fume hoods more energy efficient.

“There are high-performance fume hoods that came online about 10 years ago,” says Savage. “There are still some people who haven’t embraced this technology, but a high-performance fume hood really achieves the same level of containment as a more traditional fume hood with about 40 percent less volumetric rate of air. There is a direct correlation between the amount of air a fume hood uses and the energy it consumes. The expensive part about operating a fume hood is not moving the air but tempering the air the fume hood moves. That air is very expensive as it comes into the lab. If we can reduce the amount of volumetric air required we reduce the operating costs. We also consequently reduce the up front cost because the mechanical system is much smaller. It has a smaller job to do.”

“Other tools that exist out there include VAV (variable air volume) systems. It used to be: ‘Should I go VAV or constant volume with a high performance fume hood?’ Today we are seeing those two technologies coupled together more. So you get the savings associated with economies of scale and having most of your sashes closed that you get with a VAV coupled with a 40 percent reduction in air volume. One of the things that fume hood manufacturers are tackling today is that these VAV systems really require some protocol, they require the operator to close the sash for them to offer some savings — reduction in air volume, reduction in operating cost. So as a fume hood manufacturer we are building some intelligence into fume hoods. We offer proximity sensors on them so the sash closes when you walk away and open to an appropriate height when you approach them. This is helping tremendously when it’s tied to a VAV system.”

Handling the Bad Stuff

As companies seek to develop new products, many are turning to opportunities in developing potent and toxic compounds. These products pose additional concerns for the lab personnel that have to work with them.

“The regulations are getting tighter,” says Brian Garrett from Labconco. “Whether you are talking about cytotoxic, chemo or drug prep in general the restrictions are getting tighter and tighter. Under USP 797 there are a lot of requirements under which the labs are constructed for these types of products. This mostly affects places where they are compounding drugs that are going to be given to patients. The requirements are typically talking about ISO Class 7 cleanroom and some sort of clean air laminar flow type ventilation device that typically a clean bench or Class 2 biological safety cabinet. If you are working with sterile drug prep for chemo or cytotoxic drugs; a barrier isolator or a total exhaust biological safety cabinet is needed.”

For more information, please visit www.pharmpro.com [1].

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