

Unsolved

To Duct or Not to Duct: Chemical Fume Hoods in Your Facility

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You need to select a chemical fume hood for your facility. You are familiar with traditional chemical fume hoods, but lately you have been reading about the filtered fume hoods or something referred to as “ductless.” It gets that name “ductless” because of a filter pack located in the fume hood which takes dirty hood air and cleans it before putting it back into the lab; no ductwork to exhaust air to the exterior — thus ductless. This article discusses items and issue for consideration when deciding between choosing a ducted or ductless fume hood. Here are a handful of issues to consider:

1. What chemicals will be used in the hood?

- No ductless fume hood filters we’ve seen can capture every chemical. Before you can consider a ductless fume hood you will need to develop a list of chemicals to be used in the hood, and the quantity to be used. Ductless fume hood manufacturers will review this list and let you know if they have a filter appropriate to your chemical use.
- It is unlikely radioisotopes or perchloric acid would be used in a forensic facility, but if they are, a special ducted hood is needed to safely contain and vent these substances.

2. Purchase price and other cost concerns:

- The upfront purchase price of a ductless hood is more than a ducted hood — a 5 foot ductless fume hood from one of the major fume hood vendors is around \$28,000 (including the first set of filters), a 5 foot ducted hood is in the neighborhood of \$6,000 with no services.
- Once you factor in the needed infrastructure — duct work, exhaust fans, mechanical systems, roof elements, etc. — the overall first cost of a ducted hood is more than might seem just looking at the hood.
- Are you adding ducted hoods to an existing building? An engineer would need to evaluate the existing mechanical system to determine if the system could support the addition load. A larger mechanical system may be required to support more ducted hoods and this can have a large cost impact.
- Filter costs. For a ductless fume hood, the filter can be anywhere from a couple hundred to a thousand dollars. Each hood can have anywhere from two to six filters. Filtered hoods are engineered to capture and contain large volumes of spent chemicals in their filters, but all have to be replaced at some point. Different manufacturers offer different types of filters and these filters are going to capture or chemically bond more of some chemical and less of others. Ductless-fume-hood manufacturers offer cost analysis, where they can look at the chemicals you plan to use in the hood and tell you how long their filters will be able to do their job before they need to be replaced.
- Operating costs. A ducted fume hood, which throws heated or cooled room air out the building continuously, is going to have a much higher energy cost than a ductless hood, which filters and recirculates air back into the room, meaning much less air to be conditioning, and thus lower energy bills with a filtered hood.

3. Installation time and infrastructure:

- After the purchase order has been submitted it could take 8 to 16 weeks for the ducted chemical fume hood to show up on site. During this time other work to prep the space for installation of the hood is critical; including ductwork, controls, and exhaust air-handling systems.
- Filtered hoods generally have a shorter lead time, especially if they don't have any water or gas services. More customized units will have longer lead times. In

either case, there will be less activity in prepping for a new filtered hood compared to the coordination required to install a ducted hood.

- Some ductless fume hoods are taller than most ducted hoods, and ductless units require clear space between them and the ceiling for venting. In renovating an existing facility, floor to ceiling heights need to be evaluated to determine if they are sufficient to allow for a ductless hood.
- If you are renovating, what is your existing building's life expediency? If you think this number is low, a ductless fume hood could be more easily relocated to a new facility, so this may be a factor in deciding which type of hood to purchase.

4. User operation and education:

- From a user point of view, once a ducted fume hood is put into place, it does its thing, and exhausts air out of the building. Most of the maintenance of the unit happens as part of managing the building's mechanical system. Maintenance and Environmental Health and Safety staff deal with this, it happens in the background, with lab users generally not needing to know how the fume hood systems are maintained.
- A filtered fume hood requires the staff to truly become familiar with not only the use and operation but with the filtration system / filter package and understanding the limits for safe filtration because the air from the fume hood is filtered and put back into the occupied space.
- There also may question with a ductless hood as to who is responsible for purchasing and replacing the filters on the hood. Is this the user's responsibility, or does the maintenance staff help with the replacement?

5. Facility flexibility and future use:

- One of the best features with a ducted fume hood is that whatever you put in it gets exhausted to the outside and diluted with lots of other air that is being exhausted before hitting the atmosphere. However, the ductwork is very rigid and would require maintenance staff or a contractor to adjust the height or relocate the hood to a different spot in the facility.

- One of the best features with the ductless fume hood is that there is no ductwork preventing or hindering the height adjustment of the unit or in relocating the device to a different spot in the facility.

This article has explored some of the pros and cons of ducted versus ductless fume hoods and discussed topics which help inform which type of hood to select. A ductless hood will be right answer for one situation, and ducted hood the correct choice for another, and we hope this article helps you make an informed decision when it comes time for you to select a chemical fume hood for your facility.

Ken Mohr *is a principal and senior forensic planner with Crime Lab Design which provides full architectural and engineering services for forensic and medical examiner facilities worldwide.*
kenm@crimelabdesign.com

Cy Henningsen *is an Equipment Coordinator with Crime Lab Design.* cyh@crimelabdesign.com