



*CREATING A*  
**HEALTHY**  
**WORK ENVIRONMENT**  
*WITH COMMERCIAL HVAC TECHNOLOGY*

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# Creating a Healthy Work Environment with Commercial HVAC Technology

Today's landlords are concerned about lost rents and vacant spaces; business owners are worried about increased absenteeism and possible legal responsibility if a staff member falls ill. Commercial property managers are scrambling to ensure their buildings and indoor environments are safe, clean and comfortable for everyone. It's tough out there!

As a small business and community members ourselves, as well as HVAC professionals, we share your concerns. We're also focused on helping you maintain indoor safety as well as comfort. To that end, we've compiled up-to-date information here on how best to create a healthy work environment.

Many of our recommendations are easy fixes, and can be accomplished immediately, without a technician's help. Others will require your further consideration, as well as specific details about your particular existing HVAC system, to not only achieve maximum performance from any upgrade, but also to ensure you get the most value for every dollar you invest in repairs or installations.



[ With today's tax write offs available to business owners and our rebates on various equipment options, there are plenty of ways for savvy commercial property owners to save on these solutions.

]



# First, let's cut to the chase.

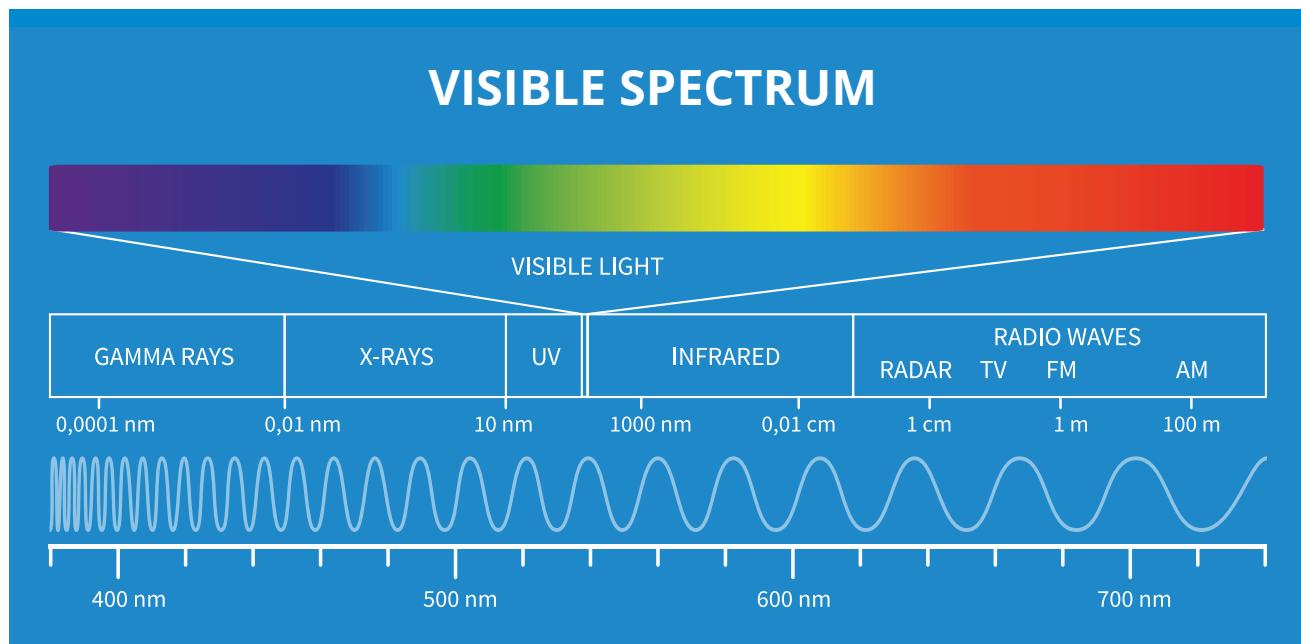
You probably already know that safety for indoor HVAC starts with UVGI light. Let's define it first: **Ultra-Violet**

**Germicidal Irradiation.** Many hospitals and research facilities already employ rigorous safeguards for their indoor air that involve this technology. Even some of our residential and business customers concerned about allergens, mold and other irritants have requested similar system add-ons. These kinds of features have moved from luxury options to practical, everyday equipment for any building.

## What is UV, and why is it useful?

Ultraviolet light waves are those 0-400 nanometers in the light spectrum. Invisible to the eye, they include the following three categories. First, there's UV-A, or long waves (315-400 nm) that are found in sunshine. Tanning booths, so ubiquitous decades ago before people realized how dangerous they were, feature UV-B, or medium wave light that's 280-315 nanometers in length. UV light for HVAC and our purposes is UV-C, or short waves that are 200-280 nanometers. This kind of light has been shown to be the most germicidal, eliminating most pathogens and viruses that come in contact with it.

In areas with high humidity and poor ventilation, UV has always been a convenient way to ensure your building avoids accumulation of bacteria within its HVAC equipment. For anyone concerned with air purification it's precisely this technology that can really make a difference in a home or commercial building. But how? The answer is threefold: proper equipment, realistic expectations, and competent installation.

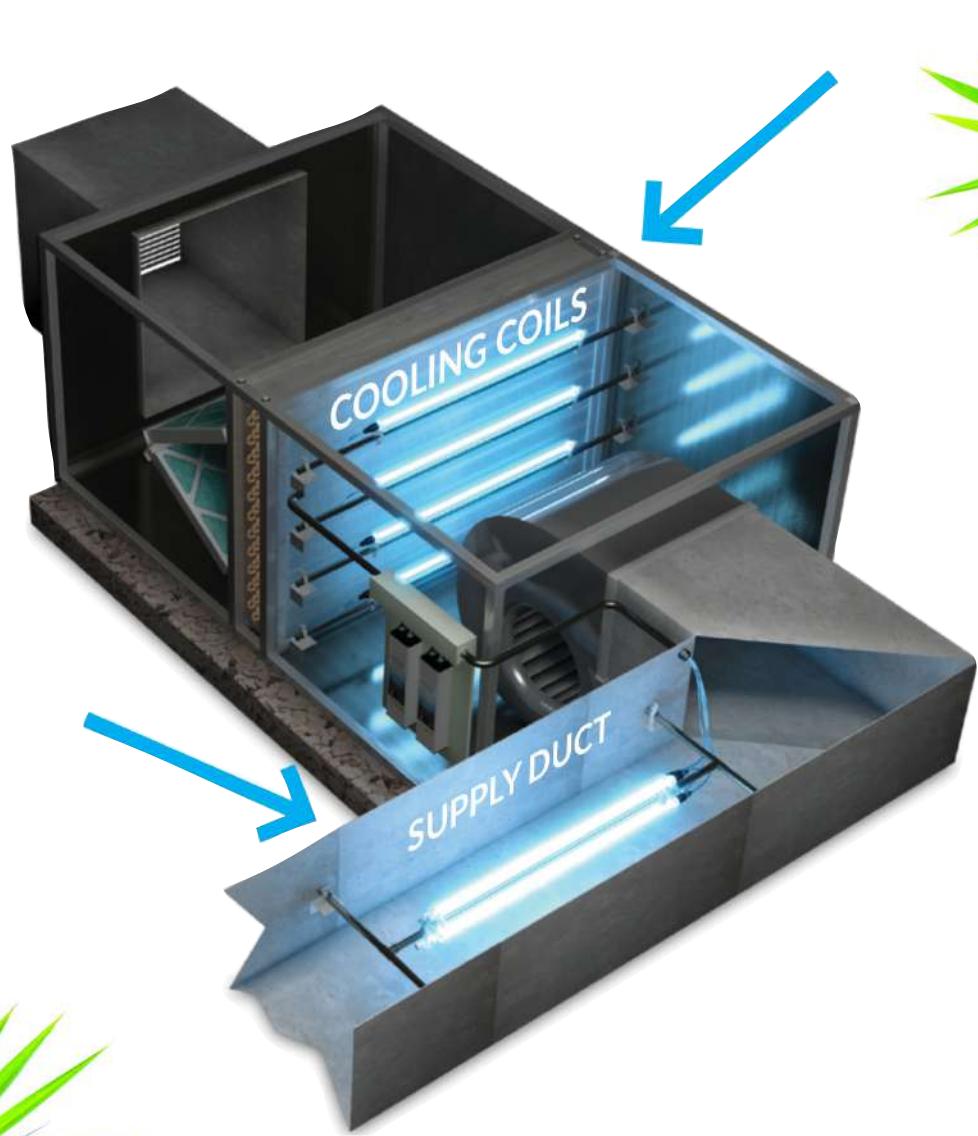


# Germicidal Control and Air Purification

UV light for HVAC addresses two things: coil sterilization and air sterilization. Coil sterilization UV lights are the most popular and as you might guess, the least expensive form of UV germicidal control. With this technique, essentially one or two stick-shaped light bulbs are placed inside your system to shine UV light 24/7 onto the air handler coil. Any viruses, pet dander, mold or other harmful irritants that would otherwise stick to its moist surface are heated into oblivion. With the air sterilization option, lights are placed inside the ductwork where air returns into the system.

The goal of this equipment is not to fry germs stuck on the air handler coils, but instead to actually eliminate viruses, germs and pathogens floating around in the return air.

Some UV air sanitation systems are set up to even sync up with your HVAC's blower motor, turning on and off along with it during a 24 hour cycle.



These options are more expensive, and complicated to install. For those reasons, they're usually incorporated only into HVAC for hospitals, labs, and other medically sensitive facilities, where an errant pathogen might wreak havoc on everyone inside.

## So you might be asking, do they work?



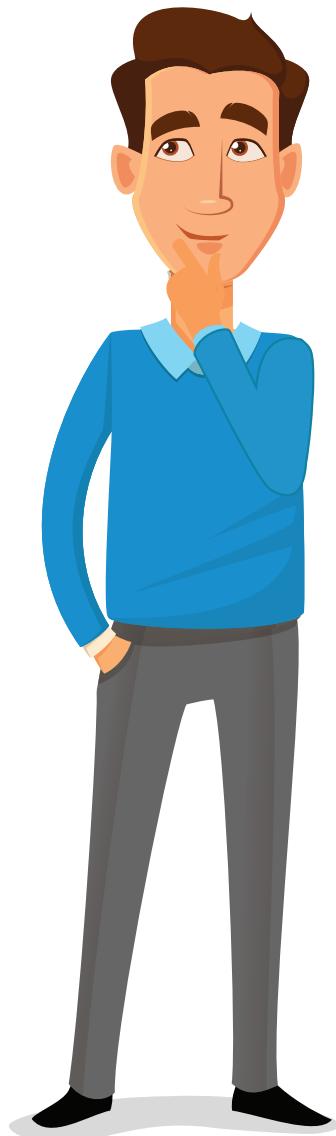
Yes. Both do, and well. In fact, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recently published updated guidelines for building design that recommended use of these UVGI devices for any high-density space, including large waiting

rooms, prisons, and homeless shelters.

Will you be able to create a pristine biosphere with the use of UVGI devices in your home or commercial building? If you run a lab researching bioweapons in lockdown underground somewhere in the Rocky Mountains, perhaps. But for the ordinary commercial property owner or even residential homeowner, probably not.

Cat hair on a sweater, a sneezing receptionist or a busy employee can spread germs just from coming inside. Nevertheless, this equipment can help, and mitigate the effects of say, the HR director's new and overpowering cologne quite well, not to mention the effects of the bad-breathed sales guy down the hall.

In other words, the quest for healthy air shouldn't stop at UV. Instead, consider the following:



## Ventilation

In many commercial buildings, it's a fact of life that the architects of recent years didn't include many opportunities for open windows and vents in their designs. This is a problem. Healthy indoor environments must include air ventilation to and from the outdoors, and plenty of it.

Indeed, the ASHRAE paper referenced above recommends increasing outdoor air ventilation by "disabling demand-controlled ventilation and opening outdoor air dampers to 100% as indoor and outdoor conditions permit."

If your building allows for opening windows, by all means open them!



However, many commercial buildings don't have windows or don't have ones that open easily. In this situation, your HVAC system's performance will be critically important to both increase airflow and its delivery throughout the indoor space.

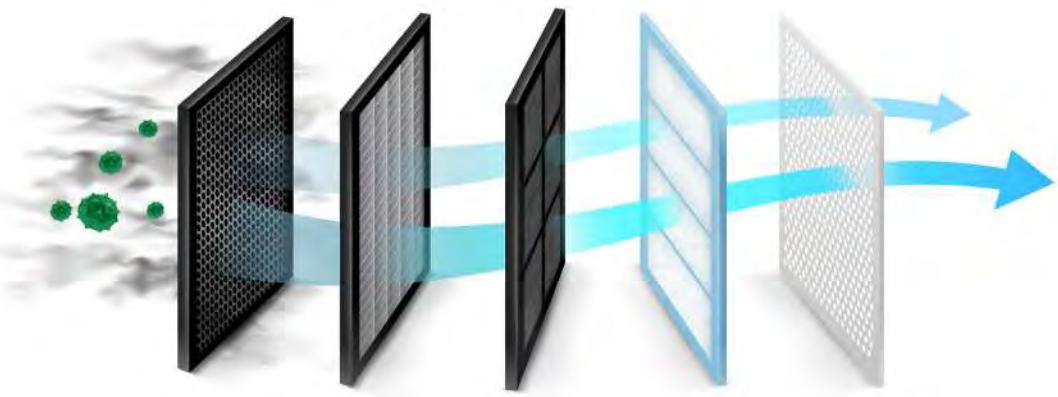
## How can you improve this aspect of your heating and air conditioning?

### Maintenance will help.

If you haven't had your system inspected in awhile, now is the time. It will not only stave off expensive breakdowns later, but also help you preserve your existing equipment long into the future. Regular service and upkeep will also keep your system functioning at peak energy saving levels, saving you costs on utilities and also improving the quality of your indoor air.

Regular maintenance ensures that leaks are fixed or eliminated, preventing moisture from accumulating in your system to spread dangerous germs and other irritants. Your technician can also make sure that lots of fresh outside air is coming into the building, and if it's not, help you find new ways to promote this kind of superior ventilation for health and safety.





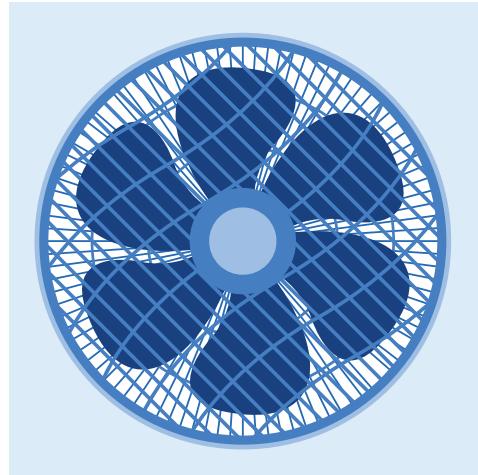
## Air Filtration

Dusty or obstructed air filters don't do as good a job at blocking pollutants or pathogens as clean, new ones. In fact, your service technician may have recommendations on even more effective air filters that can be used with your existing system. These should be changed regularly, and if possible, consider using a HEPA filter or one with a higher MERV rating than you may have used previously. These aren't expensive, and are readily available.

HVAC FILTER EFFICIENCY	MERV	MERV	MERV	MERV
	6	8	11	13
	BASIC	GOOD	BETTER	BEST
Dust & Pollen	✗	✗	✗	✗
Pollen	✗	✗	✗	✗
Dust Mites	✗	✗	✗	✗
Mold	✗	✗	✗	✗
Pet Dander	✗	✗	✗	✗
Smoke	✗	✗	✗	✗
Smog	✗	✗	✗	✗
Cough & Sneeze	✗	✗	✗	✗
Virus	✗	✗	✗	✗
Bacteria	✗	✗	✗	✗

# Blower Fan Run Times

Consider having your HVAC blower fans run 24/7, especially in commercial buildings. This does not mean you must spend more on maintaining optimal temperatures when no one is in the building to enjoy it. Simply keeping air circulation operational at a cost-effective temperature level ensures that healthy airflow will be maintained continuously. As a result, your indoor environment will be cleaner and safer throughout the times when people are there. Coupled with a sensible thermostat, you may end up saving money in operational costs. After all, by keeping a baseline temperature indoors through the year, your system won't have to work as hard to heat or cool.



## Floor Plans and Occupancy

Woe to the designer of the open office floor plan: even before 2020, thousands of office workers cursed his or her name as they helplessly listened in on their cubicle mate's phone conversations and shared their colds. The reality is that people who work in a four-walled office designed for one do call in sick less often than folks breathing other peoples' air.

If you haven't already, consider ways to mitigate occupancy rates throughout your building. Now is the time to think about moving desks away from one another, or down the hall from others. It may seem silly, but just a few more feet between workers is not only healthier, but promotes higher rates of productivity and job satisfaction too. The days of the office "bullpen" are soon to be long gone, and with it a whole lot of workplace drama as well.

Technology is always changing, and with it, our perceptions of what feels right and what feels like “overkill” in our homes and office environments. No matter what the conventional wisdom of our times, following the suggestions above are tips that are evergreen: your building will smell nicer, feel nicer, and indeed seem nicer to those inside. Many won’t even be able to put their finger on what happens to be so gosh-darn pleasant about your building. But we guarantee that when it comes time to re-up a lease, studies show that tenants seek out and prefer to occupy greener, healthier indoor spaces than their stuffy alternatives. Whether you upgrade to the latest HVAC bells and whistles, or just ensure your current system is working at its best, your efforts will go rewarded.



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Robert Helbing, PE, is President of Air-Tro Heating and Air Conditioning Company. He is a Caltech-degreed aeronautical engineer (yes – a rocket scientist!), as well as a 4th generation contractor and 3rd generation engineer. He is a past-president of the Institute of Heating and Air Conditioning Industries (IHACI); Air Conditioning Contractors of America (ACCA) Contractor of the Year, 2011; and a 15-year member of Excellence Alliance Industries, a membership organization committed to the development and improvement of HVACR companies nationwide. Bob is also a founding member and past committee chair for the Western HVAC Performance Alliance, a council of stakeholders in the Energy industry which includes utilities, regulators, manufacturers and contractors. He currently serves on two committees for the WHPA: Commercial Quality Installation and the Existing Buildings Energy Efficiency. He can be reached at 626.357.3535 and [bobhelbing@airtro.com](mailto:bobhelbing@airtro.com).

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