ATI DISASTER RECOVERY SERVICES

HVAC CLEANING AND MAINTENANCE IN A HOSPITAL/HEALTHCARE SETTING

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Introduction

Ensuring that the Heating, Ventilation, and Air Conditioning (HVAC) system in a hospital or healthcare facility requires a more stringent process than is standard for commercial or residential settings. These facilities require more refined temperature and humidity control to protect delicate machinery, high-efficiency particulate air (HEPA) filters, and measures like negative air pressure and system isolation.

Coordinating maintenance and repair in a health care setting also relies on increased involvement in planning and timing of service to prevent disruptions to 24/7 patient care and protect patient health. Proper maintenance of an HVAC system is the most effective way to uphold performance, decrease costs, protect the health of patients and providers, and increase the lifespan of the system. This document will explain the recommended processes and schedule for maintenance and cleaning, what to look for when selecting a maintenance provider, and how proper maintenance and cleaning is the most cost-effective way to ensure longevity of an HVAC system.

What's Addressed by Maintenance and Cleaning

Maintenance for the HVAC system is an expense that should be built into every healthcare facility's budget, as a well-maintained HVAC system is more affordable to operate than one that is neglected and overused. Maintenance should be preventative to catch and address issues before they happen or while they're still small enough to be dealt with swiftly and affordably. Typically, preventative maintenance will include:

- filter changes
- system cleaning
- inspecting and tightening moving parts, such as blower belts
- oil changes
- lubrication of moving parts
- minor adjustments to the machinery as needed
- addressing refrigerant and heating components seasonally

Protecting patient health, as well as the health of all staff and visitors, is the most vital concern when planning for maintenance and cleaning HVAC systems in healthcare settings. Controlling temperature, humidity, and air purity are part of this consideration. Hospitals and healthcare facilities contain delicate equipment, such as MRIs, that require strict temperature and humidity controls to operate correctly. Regular maintenance of an HVAC system ensures that these strict conditions are being met.

HEPA FILTERS ARE 99.97% EFFICIENT, MAKING THEIR HIGHER QUALITY SUITABLE FOR THE STRINGENT NEEDS OF A HEALTHCARE FACILITY.

In a hospital, filter changes also mean making sure that HEPA filtration is in the unit. The most critical aspects that are monitored to ensure the system is working as needed include checking air pressure, indoor air quality (which can have different needs in different areas of the facility), airflow rates, and air exchange rates in critical areas. The standard for a hospital is 14-16 air changes per hour. In regular HVAC maintenance, requirements like these aren't included.

Scheduling, Cleaning, and Preventing Re-Contamination

A lot of planning goes into scheduling a cleaning or routine service of a healthcare facility's HVAC unit. Typically, many key players must be involved to ensure minimum disruption to patient services and risk to patient health - the chief engineer, charge nurses, etc., all work together to make things flow smoothly. Most healthcare facilities require maintenance, cleaning, and repairs of an HVAC system to be performed at night. In some areas, work might only be scheduled when the weather is cooler to promote occupant comfort. This is because there is only a certain amount of time that air handling units (AHUs) can be shut down for maintenance before the temperature begins to change within the envelope of a building.

4 HOURS: THE AVERAGE AMOUNT OF TIME AN AHU CAN BE SHUT DOWN BEFORE NOTICEABLE TEMPERATURE CHANGE OCCURS WITHIN A FACILITY.

Reputable restoration firms follow national standards for inspecting units across the board, as set by the National Air Duct Cleaners Association (NADCA). In health care, units are inspected annually. Cleaning and filtration inspection should be performed quarterly. Different cleaning intervals are recommended for different units, although most hospitals follow NADCA's standards for patient health. The best way to ensure a healthcare facility's HVAC system is maintained and cleaned appropriately is by keeping a regular preventative maintenance (PM) schedule every quarter. That's when it's possible to tell if deeper cleaning is necessary, and more specific system recommendations can be given as needed.

Common contaminants found in these ventilation systems can often only be uncovered during scheduled system inspections. These contaminants vary in severity and impact occupant health, and the effects are exacerbated in a healthcare setting, where occupants are often patients with compromised immune systems.

- **Microbial Growth:** Most severe in humid environments due to climate or improper humidity control, but prevalent everywhere. Aspergillus spores and subsequent fungal infections are a primary concern with HVAC cleaning - any activity that generates dust or sends particulates flying leads to an Aspergillus concern, especially for immunocompromised patients.
- **Dirt/Dust:** Most common food source for microbial growth.
- **Rodents and Droppings:** Heating, AC, plumbing, electrical service, and fire sprinklers are primary points of entry into an HVAC system. Age makes a system more vulnerable.
- **Insulation:** More prevalent in older systems from being loosened by maintenance and age.
- **Construction Debris:** Most common during construction within a building. Newly installed/ expanded systems should be verified clean before operation.
- **Hidden Damage and Other Concerns:** Most commonly stemming from other structural issues like damaged roofs, leaking pipes/water damage from floors above, and human interference.

After cleaning and maintenance are performed, it is vital to ensure that a healthcare facility makes the most of the service and reduces the risk of re-contamination after cleaning.
The key components to preventing re-contamination include:

- Maintaining preventive maintenance programs as recommended by the service provider and the manufacturer of the HVAC equipment
- Implementing in-house HVAC cleanliness inspections for up-to-date cleaning protocols
- Using the highest efficiency air filter recommended by the manufacturer
- Changing filters on schedule or as needed when determined during the cleanliness inspections
- Checking for air bypass around filters and through gaps around the filter holders to ensure all air is being appropriately filtered
- Controlling, reducing, or eliminating indoor moisture as much as possible
- Investigating occupant complaints promptly, especially regarding poor temperature regulation or noticeable scents in conditioned air

THERE ARE
6,090
HOSPITALS IN THE UNITED STATES,

WITH
919,559
BEDS AVAILABLE FOR PATIENTS.*

*SOURCE: AMERICAN HOSPITAL ASSOCIATION, 2021

Certifications and Training

HVAC mechanical system cleaning should only be performed by NADCA certified technicians and companies. NADCA sets the professional standard throughout the industry, whether for residential, commercial, industrial, or healthcare settings. Due to the severe risks to patient health posed by cleaning an HVAC system, NADCA certifications are vital for the best outcomes. These cleanings can stir up dust and other airborne debris and contaminants that pose a health risk to immunocompromised people in particular.

Other certifications to look for include:

- Air Systems Cleaning Specialist (ASCS)
- Ventilation Maintenance Technician (VMT)
- Certified Ventilation Inspector (CVI)
- Pre-Construction Risk Assessment – Infection Control Risk Assessment (PCRA/ICRA)

These certifications can be part of acquiring a broader NADCA certification for a properly licensed technician. PCRA/ICRA certifications are for technicians who specialize in servicing the healthcare industry.

It is important to note that there can be a difference between HVAC technicians that are certified for cleaning and preventative maintenance, and those certified for installation, design, or more involved mechanical needs. A reputable firm that handles cleaning and maintenance can make recommendations for cost-effective bids from fully licensed HVAC companies for healthcare facilities in need of these services. They can also work with any company that a hospital or healthcare facility already has an established contract with for ease of service.

What to Expect From Your Technician

BELOW IS A BASELINE FOR HOW TO QUALIFY A NADCA CERTIFIED HVAC MAINTENANCE AND CLEANING SERVICE:

- Experience erecting ICRA compliant containments
- Competency with engineering controls and mechanical drawings
- Maintaining pressure differentials for negative pressure to protect air quality
- High standards for equipment usage and maintenance, including equipment and tool decontamination
- Full OSHA and Hazcom requirements compliance
- Strict adherence to local and state laws and regulations

COMMON BEST PRACTICES FOR PERFORMING MAINTENANCE AND CLEANING INCLUDE:

- Using vacuum equipment that exhausts particles outside the building or using only HEPA vacuuming equipment if the vacuum exhausts inside
- Utilizing proper levels of containment and pressure differentials, as needed
- Using appropriate tools and agitation equipment designed for ventilation system cleaning
- Leaving work areas tidy and decontaminated at the end of each shift and/or end of job
- Thoroughly communicating and documenting findings, concerns, and job status to minimize disruptions

Cost Efficiency

Most hospitals and healthcare facilities run older HVAC units, which means they are less efficient, creating higher operating costs. If possible, a facility should consider making an upgrade to the entire HVAC unit. Implementing regularly scheduled PM measures will protect the system a facility already has and extend its viability.

HVAC SYSTEMS ARE TYPICALLY RESPONSIBLE FOR

33% OF THE ELECTRICITY | **56%** OF THE NATURAL GAS

CONSUMED IN HEALTHCARE FACILITIES.*

*SOURCE: US ENERGY INFORMATION ADMINISTRATION

Ductwork cleaning is invasive and time-consuming, though it is necessary every three to five years. The most cost-effective way to keep an HVAC system clean is coil cleaning and cleaning air handling units (AHUs) as recommended by NADCA and the manufacturer of the unit. Regular maintenance of your HVAC unit ensures maximum efficiency and prevents considerable expense resulting from neglected systems.

Depending on the age of a current HVAC unit, the most cost-effective approach might be to upgrade the entire system. This should be regarded as a long-term investment to improve patient outcomes and protect the facility's budget. There are guidelines put in place by organizations like Energy Star, a federal program, to help a facility decide if the time is right.

- Unit is ten years old or older
- Noticeable energy bill increases
- Needs frequent repairs (beyond what is expected with proper maintenance)
- Noticeable dust or humidity issues
- Specific areas and rooms that struggle to maintain proper temperature

If one or more of these criteria describes a facility's HVAC unit, it might be time to upgrade to a new, technologically advanced system with better energy efficiency to save money and protect the environment.

HVAC systems are the lungs of a healthcare facility. Keeping them in good condition not only saves money but protects the health of all occupants. Having solid baseline knowledge of how to qualify a technician and the best approach for scheduling maintenance, repairs, and cleaning will keep a facility's system in proper order for prioritizing patient health and ensuring the best use of a facility's budget for HVAC needs.

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