



HVAC 101 – Maintaining Indoor Air Quality and Comfort

What is an HVAC System?

"HVAC system" refers to the equipment that provides heating, ventilation, filtration, and air conditioning to maintain comfort and healthy environmental conditions within a building.

Introduction

The Facilities and Parks Services Division maintains, adjusts and repairs HVAC systems in nearly thirty County buildings. The dedicated HVAC staff provides a full range of HVAC maintenance services, including customer response and troubleshooting. Most Americans spend up to 90% of their time indoors and many spend most of their working hours in an office environment. This elevates the concern for indoor air quality because it can impact the health, comfort, well-being, and productivity of building occupants.

Indoor Air Quality (IAQ)

The Facilities and Parks Services Division defines a healthy indoor environment as one in which the surroundings contribute to productivity, comfort, and a sense of health and well-being. Our IAQ Program's goal is to provide air that is free from significant levels of odors, dust and contaminants, and circulates to prevent stuffiness without creating drafts. We also strive to provide temperature levels that are appropriate for the season and to the clothing and activity of the building occupants. Our working definition of good indoor air quality includes:

- Introduction and distribution of adequate ventilation air. Most air handling units distribute a blend of outdoor air and recirculated indoor air.
- Control of airborne contaminants. Washington County uses a number of methods to control airborne contaminants including: dilution through the introduction of outdoor air; maintain pressure relationships between rooms (positive and negative pressure); maintenance of HVAC equipment; and the use of air cleaning and filtration devices.
- Maintain an acceptable temperature. The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 55-1981 describes the temperature and humidity ranges that are comfortable for most people engaged in largely sedentary activities. The ASHRAE standard assumes "normal" indoor clothing. Washington County adheres to the standards and generally attempts to maintain office buildings at 68 to 76 degrees. The actual temperature will vary depending on the season.

Factors Affecting Indoor Air Quality

The indoor environment in any building is a result of the interaction between the site, climate, building system (original design and later modifications in the structure and mechanical systems), construction techniques, contaminant sources (building materials and furnishings, moisture, processes and activities within the building, and outdoor sources), and building occupants.

Mitigating IAQ Problems

Over the years many types of mitigation strategies have been implemented to solve indoor air quality problems. Control strategies can be categorized as:

- Source control
- Ventilation
- Air cleaning

Successful mitigation often involves a combination of these strategies.

Source Control

Include efforts to identify and control pollutant sources. This includes limiting smoking areas; select products that produce fewer or less potent contaminants; and improve storage of materials that produce contaminants.

Ventilation

This approach is effective where buildings are under-ventilated or where a specific contaminant source cannot be identified. Ventilation can be used to control indoor air contaminants by 1) diluting contaminants with outdoor air and 2) isolating or removing contaminants by controlling air pressure relationships.

Air cleaning

Air cleaning is usually most effective when used in conjunction with either source control or ventilation; however, it may be the only approach when the source of pollution is outside of the building. Particulate Filtration removes suspended liquid or solid materials whose size, shape, and mass allow them to remain airborne for the air velocity conditions present. Filters are available in a range of efficiencies, with higher efficiency indicating removal of a greater proportion of particles and of smaller particles. Washington County uses filters in all HVAC systems. Electrostatic Precipitation is another type of particulate control (also known as ion air). It uses the attraction of charged particles to oppositely charged surfaces to collect airborne particulate. In this process, the particles are charged by ionizing the air with an electric field. The charged particles are then collected by a strong electric field generated between oppositely charged electrodes. Electrostatic Precipitation is used in conjunction with filters and has been installed in the Justice Services Building, Animal Shelter and Master Control (LEC). Facilities staff is evaluating use in other buildings.

Facilities Operations and Maintenance of County HVAC Systems

Indoor air quality can be affected both by the quality of maintenance and by the materials and procedures used in operating and maintaining the building components including the HVAC system. Facilities staff who are familiar with the building systems in general and with the features of their building in particular are an important resource in preventing and resolving indoor air quality problems.

The Washington County HVAC crew is committed to best practices and quality workmanship in maintaining the HVAC equipment in nearly thirty (30) facilities.

Our work includes:

- Equipment Operating Schedules: Confirm the timing of occupied and unoccupied cycles is compatible with actual occupied periods, and that the building is flushed by the ventilation system before occupants arrive.
- Control of Odors and Contaminants: Maintain appropriate pressure relationships between building areas. Avoid recirculating air from areas that are strong sources of contaminants. Make sure paints, solvents, and other chemicals are stored and handled properly.
- Ventilation Quantities: Compare outdoor air quantities to the building design goal and local and State building codes and make adjustments as necessary.
- HVAC Equipment Maintenance Schedule: Inspect all equipment regularly (per recommended maintenance schedules) to ensure that it is in good condition and is operating as designed.
- HVAC Inspections: Perform equipment inspections on regular basis using inspection checklist.
- Building Maintenance Schedules: Schedule maintenance activities that interfere with HVAC operation or produce odors and emissions so that they occur when the building is unoccupied.
- Temperature Setting and Monitoring
- Janitorial: Ensure effective janitorial service to remove dust and dirt. Use cleaning products that eliminate or limit the emission of noxious odors.

Other Factors that Affect Occupant Comfort and Productivity

Besides the factors that directly impact the levels of pollutants to which people are exposed, a number of environmental and personal factors can affect how people perceive air quality. Some of these factors affect both the levels of pollutants and perceptions of air quality.

- Odors
- Temperature—too hot or cold
- Air velocity and movement—too drafty or stuffy
- Heat or glare from sunlight
- Glare from ceiling lights, especially on monitor screens
- Furniture crowding
- Stress in the workplace or home
- Feelings about physical aspects of the workplace: location, work environment, availability of natural light, and the aesthetics of office design such as color and style

- Work space ergonomics, including height and location of computer, and adjustability of key boards and desk chairs
- Noise and vibration levels
- Selection, location and use of office equipment

You can help us!

- Dress according to your personal comfort level.
- Washington County prohibits the use of space heaters in County building. The use of personal heaters impacts the efficient regulation of building air temperature, may overload electric circuits, increases consumption of electricity and introduces associated risk concerns.
- Do not block air vents or grilles
- Comply with the office and building smoking policy
- Water and maintain office plants properly
- Dispose of garbage promptly and properly
- Store food properly
- Avoid bringing products in the building that could release harmful or bothersome odors or contaminants
- Notify your Facilities Liaison immediately if you suspect an indoor air quality problem.