Dickinson

Follow Up Responses to Campus Ventilation Inquiries

OVERVIEW:

Dickinson owns or leases more than 125 buildings encompassing approximately two million gross square feet of space. Our recently constructed and/or renovated buildings include modern ventilations systems which meet or exceed current building codes. Our seven LEED certified buildings are a testament to our commitment to healthy buildings with excellent indoor air quality. As we move forward, we will continue to modernize our buildings to meet these standards. That said, the renovations that would be required to achieve improved indoor air quality in our existing buildings is quite extensive and would be extremely costly. With that understanding, the information that is provided below details the manner that we are operating our existing buildings to achieve the best indoor air quality possible within the limits of the Heating, Ventilation and Air Conditioning (HVAC) systems that are currently in place.

PREVIOUS INFORMATION INCLUDED IN OUR SPRING/SUMMER 2020 – COVID FAQ's:

How is the college addressing ventilation?

Ventilation

Most modern systems have been designed to provide a specific quantity of air changes per hour (exchange rate) based on the type of space. Labs range from 4 to 12, offices/classrooms are 2 to 3; and bathrooms are 5 to 10. This exchange is accomplished by having dedicated exhaust systems or by introducing outside air into the building airstream. Our older facilities and small houses do not have direct mechanical make up and rely more on infiltration to introduce fresh air.

To ensure a safe campus environment, facilities management maintenance staff will closely monitor the performance of building air handling units daily via the automated controls program. Due to the concern surrounding COVID-19, more detailed in-person spot checking will also occur, especially in those buildings without these controls.

Where possible, facilities management will be increasing air exchange rates to maximize the amount of fresh air. This will be accomplished by disabling demand-controlled ventilation and opening outdoor air dampers as outdoor conditions permit. Additionally, filters will be inspected and replaced with higher efficiency ones where equipment age and configuration allow.

Windows

It will be possible to open windows in most locations but please pay attention to the outside air temperature and humidity conditions. On very hot and humid days, introducing too much warm air will make it difficult for the mechanical systems to maintain building set-points. This could result in environmental hazards such as mold and mildew. Ideally, acceptable outdoor air temperatures should

be between 50 and 60 degrees to open windows. Humidity levels should be less than 60 percent. Windows should be closed when leaving spaces.

Bathrooms

All bathrooms have some type of exhaust system either as part of a building wide system or individually. While it may be tempting to open windows in bathrooms, this practice is not recommended as air exchange may be reduced due to short cycled air flow patterns.

INFORMATION UPDATE NOVEMBER 2020:

Facilities management has been addressing the campus HVAC ventilation systems in accordance with the plan outlined in the original FAQ response.

FILTERS: The High Street Residence Hall, Tome and the Rector complex, and the Waidner side of the Library are the primary campus buildings that have high efficiency filters. After reviewing the other major systems, it has been determined that we are unable to increase filtration without negatively impacting system performance, such as maintaining air exchanges and space temperatures. Renovation and significant cost would be required. While increasing filtration efficiency is not possible, Facilities Management will be increasing the rate of filter replacements and is committed to having the fresh filters installed in the major systems by the start of the spring semester.

DAMPERS: Modulating the outdoor air dampers on most systems is done by manual control and is therefore a labor-intensive task. Currently, staff have increased the damper settings to achieve 10% outside air, on the average. This is the maximum adjustment possible to increase outside air while continuing to maintain comfortable indoor air temperatures. The greater the delta between comfortable indoor air temperatures and outside air temperature, the more challenging, inefficient and costly it becomes to increase outside air percentages.

UNIT/SYSTEM CLEANING: As time permits, staff have been cleaning and sanitizing the HVAC units, including the coils and drain pans. Buildings completed to date include Bosler, Denny, Weiss and the HUB.

OPERATION TIME: To help improve indoor air quality, recent guidance has recommended to operate ventilation systems two hours before and after building occupancy. Therefore, starting in the spring, HVAC systems will run from 6 am to 6 pm in most academic and administrative buildings. Other buildings such as the HUB, the Kline Center and residence halls will be operated as per their normal schedules. As previously indicated, our trades unit is continuing to monitor the systems for optimum performance and ensure the health and safety of the campus community.

AIR EXCHANGE RATES/ AIR RECIRCULATION: The college does not have data on air exchange rates or air recirculation percentages in our buildings. All of our buildings recirculate a certain percentage of indoor air, except for the majority of spaces in the Rector Science Complex, which have 100% outside air to ensure health and safety associated with the labs. Significant investment would be required to conduct an HVAC assessment aimed at obtaining air exchange and recirculation data. Once completed,

a far greater investment would be required to renovate HVAC systems on campus to achieve a higher level of performance. We are currently operating our HVAC systems to achieve the maximum indoor air quality possible.

AIR DISINFECTION VIA UVC LIGHT AND/OR BI-POLAR IONIZATION: Technologies exist that claim to kill airborne virus, bacteria and other contaminants within HVAC ductwork. These technologies are referred to as air-disinfecting technologies, and include UVC light systems and bi-polar ionization systems. Although there is evidence that they both work in laboratory settings, there is less evidence that they work in HVAC systems, where the velocity of the air and other factors may render them ineffective, and in the case of bi-polar ionization, even potentially unsafe.

Notably, the *American Society of Heating, Refrigerating and Air-Conditioning Engineers* (ASHRAE) endorses UVC light systems as interventions for improved air quality in HVAC applications, but does not endorse bi-polar ionization. In the 2018 ASHRAE document titled *ASHRAE Position Document on Filtration and Air Cleaning*, it states that "…UVC has been shown to inactivate virus, bacteria and fungi." That said, ASHRAE and other sources indicate that UVC light works best as a surface disinfectant within HVAC systems, as opposed to an air disinfectant, depending on variables such as air velocity and air volume within the HVAC ductwork.

Bi-polar ionization, on the other hand, has been historically challenged by the technology's creation of ozone, which presents health and environmental risks. ASHRAE and the CDC will not endorse a technology that produces unhealthy levels of ozone, and therefore, to our knowledge, bi-polar ionization has not been recognized by either organization as a viable IAQ intervention. In fact, in ASHRAE's document titled *Filtration/Disinfection, it states that "…*convincing scientifically rigorous peer-reviewed studies do not currently exist on this emerging technology…." Further, the CDC has stated that "…needlepoint bi-polar ionization has a less-documented track record in regards to cleaning/disinfecting large and fast volumes of air moving within HVAC systems."

Although a company named *Global Plasma Solutions* (GPS) has developed a needlepoint bi-polar ionization technology which the company says does not produce ozone, to our knowledge neither ASHRAE nor the CDC has commented on this specific technology or product. GPS calls out certain electrical aspects of their technology as being ASHRAE and/or UL approved, but not the overall product/system.

Moving forward, we will continue to assess UVC light and other emerging technologies and upgrades related to HVAC systems and IAQ to ensure that our buildings are healthy and operationally sustainable.