

Commissioning Ventilation Assessment

Farmington Public Schools

Schools

Farmington High School
Irving Robbins Middle School
Noah Wallace Elementary School
Union Elementary School
East Farms Elementary School
West District Elementary School
West Woods Elementary School



Prepared by:

Consulting Engineering Services, Inc.

811 Middle Street, Middletown, CT 06457

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Farmington Commissioning Ventilation Assessment

Overview

Following the in-depth review and testing of equipment components pertaining to building ventilation systems, corrections to deficiencies identified and adjustments considered to maximize outside air, it has been determined that the district has made necessary systems modifications and adjustments to the fullest extent that the existing equipment allows in an effort to maximize outside air, provide proper filtration, and schedule equipment accordingly to ensure ventilation is occurring within the parameters of the guidelines set forth by the State of Connecticut.

Objectives and Goals

Objectives

The intent of this process was to verify and ensure that building elements and systems pertaining to ventilation are operating properly in response to the “Guidance for School Systems for the Operation of Central and Non-Central Ventilation System during the COVID-19 Pandemic” document provided through the State of Connecticut Department of Health.

As noted in the guidance document, “improving ventilation may not necessarily be the most effective tool for reducing transmission of the virus that causes COVID-19...., some studies suggest that adjustment and attention to proper ventilation can reduce the viable virus load in indoor spaces.” The intent for this commissioning process and any recommendations that come out of it is to improve ventilation as one part of the schools system procedures in response to the pandemic.

Goals

1. Assist in confirmation of increasing outside air ventilation by coordinating efforts with controls contractor for disabling demand controlled ventilation systems and opening out door air dampers as much as possible as indoor and outdoor conditions permit. Fans shall run continuously during occupied mode where control adjustments are possible.
2. Assist with suggestions for tuning ventilation systems to enable them to perform at the maximum capacity consistent with full occupancy conditions for the building.
3. Assist with suggestions for proper filtration.

Project description and summary of scope of work

CES provided commissioning services for all of the HVAC systems as it pertains to Ventilation including:

- Scope Task: Identify building systems and associated capabilities.
Result: **IDENTIFIED and CONFIRMED**
- Scope Task: Review operation of all ventilation systems for the desire to run equipment 1 week prior to the re-opening of school buildings while maintaining temperature and humidity at reasonable levels.
Result: **VERIFIED**
- Scope Task: Identify systems and associated controls are operating properly as they pertains to ventilation and provide suggestions where controls adjustments can be made.
Result: **VERIFIED**

- Scope Task: Review schedule parameters and provide recommendations for adjustments where possible through controls for desired levels for purging systems for minimum of 2 hours prior to occupancy and 1 hour after occupancy.
Result: **VERIFIED**
 - **All air handling equipment including air handling units, rooftop units, heating and ventilating units, heat recovery units, air conditioning rooftop units, energy recovery ventilators, energy recovery units, fan coil units and unit ventilators are all scheduled to operate in order to ensure that there is a 2 hour purge prior to occupancy and 1 hour post occupancy purge.**
- Scope Task: Review ventilation for operation during all hours that the building is occupied.
Result: **VERIFIED for air handling equipment and exhaust fans.**
- Scope Task: Review all bathroom exhaust operation. Guidance calls for exhaust systems run 24/7.
Result: **VERIFIED**
- Scope Task: Filters and Frames - Confirm clean filters are in place and associated racks are in good condition.
Result: **VERIFIED**
- Scope Task: Dampers and associated actuators: Provide visual inspection where possible of control dampers to ensure integrity of ventilation to the spaces.
Result: **VERIFIED**
 - **All damper operation has been tested and physically witnessed. Where issues were discovered, adjustments/corrections were made by facilities staff and/or their associated contractors in an effort to ensure all dampers are open to their maximum capacity with considerations made for temperature and humidity control.**
- Scope Task: Where necessary, inspect, verify and suggest modifications to all automated setpoints including CO2 and temperature.
Result: **VERIFIED**
 - **Demand control ventilation (CO2 override was reviewed). Where demand control ventilation was a part of the sequence of operation, control was disabled either via direct override of outside air damper position or via reduction in associated CO2 setpoint from standard 800ppm to at or below ambient concentration level setpoint.**
- Review locations of supply and return diffusers to evaluate effectiveness and possible short-circuiting and provide suggestions for improvements if/where applicable.
Result: **No issues discovered.**

Schools Assessed

1. Farmington High School
2. Irving Robbins Middle School
3. Noah Wallace Elementary School
4. Union Elementary School
5. East Farms Elementary School
6. West District Elementary School
7. West Woods Elementary School

Systems Commissioned

1. HVAC equipment operation and controls as it pertains to Ventilation
2. Associated Dampers
3. Filters - cleanliness
4. BMS Schedules (where applicable)

Commissioning Process

The Commissioning Team utilized a combination of remote review of systems for performance as well as visual inspections to ensure that the schools are being properly ventilated. In an effort to do so, we reviewed the following: Rooftop Units, Air Handling Units, Heat Recovery Units, Heating/Ventilating Units, Unit Ventilators, Exhaust Fans and Fan Coil Units. This equipment was reviewed for this assessment as this equipment is a part of ventilation of spaces bringing in outside air or exhausting air out of the building. Working both on our own and directly with the facilities staff, we reviewed and tested all associated equipment in each school to confirm the following:

All issues were reported directly to the facilities staff and have all since been fully addressed.

- Supply Fan command and status was reviewed remotely through the building management system and actual fan status was reviewed through visual onsite inspection.
- Damper commands and status was reviewed remotely through the building management system and actual damper position was reviewed through visual onsite inspection.
- Exhaust Fan command and status was reviewed remotely through the building management system and actual fan status was reviewed through visual onsite inspection.
- Where demand control ventilation is provided as a part of the sequence of operation, it was noted and suggested to be disabled by adjusting the CO2 limit to below ambient or via direct override of the associated outside air damper.
- Filter rack and associated filters were reviewed for condition and all issues were reported directly to the facilities staff.

Conclusions

After remote and on-site review of all components as it pertains to ventilation, it has been determined that the Farmington Schools noted in this report are in good working condition as it pertains to ventilation. All damper positions, fan status, schedules, CO2 parameter, filters and all other components associated to ventilation have been reviewed and tested. All deficiencies reported were provided directly to the facilities staff for correction and CES worked directly with the facilities staff in tracking resolution of noted deficiencies. After our thorough review and testing and coordination with the Town of Farmington for correction of issues, utilizing our Master Deficiency Log, we have been able to successfully track all information and identify that all ventilation concerns/issues have been fully addressed.

Recommendations

Pre and Post Occupancy Purge and Scheduling

CES suggested programming all units bringing in outside air to purge with increased outside air for 2 hours prior to the start of occupied hours and post purge for 1 hour after occupied hours. All air handling equipment and general exhaust has been adjusted to allow for this pre purge and post purge - **VERIFIED**

Minimum outside air damper positions

Minimum outside air damper positions can be adjusted based on the needs of the building, increasing minimum position if conditions allow.

- During shoulder seasons (spring and fall), the weather is naturally tempered and better suited for the introduction of outside air with limited concerns for bringing in outside air that needs to be dehumidified or tempered with mechanical heating/cooling.
- During summer months with increased ventilation beyond the designed control parameters, it may be difficult to maintain temperature and humidity within the building.
 - With the allowance of increased ventilation, temperature swings and high humidity conditions may be experienced.
- During the winter months, similar concerns with temperature maintenance should be understood with increased ventilation in place. There can be freezing concerns during the winter months and/or units tripping on freezestat when the outside air temperatures are too with increased outside air damper position. This should be kept in mind. Any adjustments that are made during the summer months to increase ventilation must be considered for the winter months.



