## **Section 2 - Filtration**

## Ventilation Verification and Energy Optimization Assessment

|  |  |
| --- | --- |
| [ ]  | **Existing Filter Data** |
|  | * Document rating of existing filters.
 |  |
|  | * Document filters size/depth/quantity.
 |  |
| Size: | Depth: | Quantity: | MERV: |
| Size: | Depth: | Quantity: | MERV: |
|  | * Is the filter installed correctly? *If not document the deficiency and take any measurements required to make the repair.*
 | Y/N |
|  | * Are the frames and filter bank free of any openings around the filters that would allow for untreated air to bypass the filters? *If not document the deficiency and take any measurements required to make the repair.*
 | Y/N |
|  | * Determine type of motor and control (ECM, VFD, Belt, Direct).
	+ Document nameplate and installed components as applicable.
 |  |
| **Motor** |  |  |
| Manufacturer = | Model = | Phase = |
| HP = | Frame =  | RPM =  |
| HZ =  | Service Factor = | Amps = |
| Volts = | ECM = Y/N |  |
| **Drive Assembly** | Belt Driven [ ]  | Direct Drive [ ]  |
| Belt(s) Number= | Belt Type= | Belt Length:  |
| Center to Center = |  |
| Motor Sheave | Model: | Shaft Size: | Position (if Variable): |
| Fan Sheave | Model: | Shaft Size: |  |
| **Variable Frequency Drive (VFD)** |  Yes [ ]  No [ ]  |  |
| Manufacturer = | Model = | Operating Hz: * Full cooling or High Fan Speed
 |
|  | * With unit operating at full cooling, or high fan speed, what is the filter pressure drop?
 |  In. w.c. |
| [ ]  | **MERV 13 Verification** |
|  | * MERV 13 or better filtration is installed.
 | Y/N |
|  | * If MERV 13 or better filtration is not installed, perform the following steps to determine the highest Minimum Efficiency Reporting Value (MERV) filtration that can be installed without adversely impacting equipment.
 |  |
|  | * Obtain the existing filters new and final pressure drop from the manufacturer.
 | [ ]  |
|  | * Posture the unit to provide full cooling, or high fan speed, and disable the economizer.
 |  | [ ]  |
|  | * With the existing filters installed, perform and document a static pressure profile, temperature profile, fan RPM, Motor RPM, voltage and amps.
 | [ ]  |
| ESP Δ = | TSP Δ = | Filter SP Δ = |
| Fan RPM = | Motor RPM =  | Mixed Air (RA+OSA) Temp =  |
| Supply Temp =  | Voltage = | Amps = |
| Hertz (Hz) = |  |  |
|  | * Using the previously recorded data as a baseline, determine the maximum filter pressure drop, without adversely impacting equipment, by adding material to the filter until the measured or calculated airflow drops by no more than 5%.[[1]](#footnote-1)
* Primary Method to verify airflow - Directly measure the change in airflow if accessible and efficient.
* Secondary Method – Calculate the change in airflow
	+ $CFM\_{N}=CFM\_{O }× √\frac{SP\_{N}}{SP\_{O}}$
 | In. w.c |
|  | * With the maximum pressure drop achieved, document static pressure profile, temperature profile, fan RPM, Motor RPM, voltage amps, and note the ability to increase fan speed if needed.
 | [ ]  |
| ESP Δ = | TSP Δ = | Filter SP Δ = |
| Fan RPM = | Motor RPM =  | Mixed Air (RA+OSA) Temp =  |
| Supply Temp =  | Voltage = | Amps = |
| Hertz (Hz) =  |  |  |
|  | * Verify air volume, under maximum pressure drop condition, is within manufacturers specifications. Commonly specified as:
* Minimum CFM per ton (or)
* Minimum Supply Air Temperature
 | [ ]  |
|  | * If applicable, document and take any measurements required to increase the filter frames to accommodate deeper filters.
 | [ ]  |
|  | * Remove added material and provide documentation in the assessment report so a licensed professional can determine the highest MERV filtration that can be installed with the existing equipment.
 | [ ]  |
|  | * Return the unit to normal operation and enable the economizer.
 | [ ]  |
|  | * Include relevant photographic documentation
 | [ ]  |

*This document is intended to be used solely as an aide when developing the methods, procedures, and forms used in the Ventilation Verification and Energy Optimization Assessment.  It is the responsibility of each contractor, supervisor, and technician to ensure that the methods, procedures, and forms used meet the requirements of the local mechanical codes.  The National Energy Management Institute Committee makes no representations, whatsoever, that drafting procedures or forms based on this document will meet that requirement of local mechanical codes and expressly disclaims any liability or responsibility regarding the use of this document.*

1. 5% recommendation and maximum pressure drop determination steps derived from: ASHRAE, ASHRAE Epidemic Task Force: Building Readiness (February 1, 2021) (<https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf>) [↑](#footnote-ref-1)