From: Eric Vander Mey <ericv@rushingco.com>
Sent: Monday, June 13, 2022 5:26 PM
To: DES SBCC <sbcc@des.wa.gov>
Subject: Public Comment for MVE Meeting - 2021 WSMC Proposal 098 - Filtration

See below for public comments on 2021 WSMC Proposal 098 (Mike Fowler)
Based on the extensive TAG work on this proposal and final meeting revisions I am providing following editorial comments to improve the enforceability of the proposed modifications and to provide consistency with the mechanical code.

Comments are based on the final version that was passed by the TAG on 6/2/2022 as shown below for reference:

605.1 General. ~~Heating and air conditioning~~Air handlers and ventilation systems shall be provided with *approved* air filters in accordance with Section 605.4. Filters shall be installed such that all ~~return air,~~ **recirculated air** ~~-~~ **and all** outdoor air ~~supplied to occupiable space, and makeup air~~ is filtered upstream from any heat exchanger or coil ~~and upstream of all cooling coils or other devices with wetted surfaces through which air is supplied~~. Filters shall be installed in an *approved* convenient location. Liquid adhesive coatings used on filters shall have a flash point not lower than 325°F (163°C).

Exception: Cooling coils that are designed, controlled and operated to provide sensible cooling only do not require filtration at the terminal device.

605.4 Particulate matter removal. Particulate matter filters or air cleaners **shall have** ~~having~~ a minimum efficiency reporting value (MERV) of not less than **the following:** ~~6 for ducted air handlers and not less than 4 for ductless mini-split systems shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space~~.

1. **MERV 13 for ducted air handlers and ventilation systems serving occupiable spaces in Group A, B, E, M, R, and I occupancies,**
2. **MERV 8 for ducted air handlers and ventilation systems serving occupiable spaces in Group F, H, S and U occupancies, and**
3. **MERV 4 for unducted air handlers and fan coil units.**

Exceptions:
1. Ducted air handlers and ventilation systems 500 cfm or less shall have a filter not less than MERV 8.
2. Exhaust or relief air upstream from a heat exchanger or coil shall have a filter not less than MERV 6.

Editorial comments are as follows (see below for additional 2021 IMC and 2018 WSMC references):

1. 605.1. Second Sentence: Unstrike "return air"
    - Change is needed to be consistent with model code
    - Change is needed to not make the code less stringent that 2018 WSMC
    - Term return air is needed as this clarifies that air that is return to be exhausted upstream of an energy recovery coil is required to be filtered
        - See definition below of return air
    - Return air should be in italics as a defined term
2. 605.1. Second Sentence "all": Use word "all" once at the beginning only (or in front of each type of air described)
    - Change is need to have a consistent use of the word "all" in the sentence
3. 605.1. Second Sentence: Unstrike "makeup air"
    - Change is needed to be consistent with model code
    - Change is needed to not make the code less stringent that 2018 WSMC

- Term makeup air is needed as this clarifies that air that is transfer may be required to be filtered
    - See definition below makeup air
- Make up should be in italics as a defined term

4. 605.1. Add new exception 2 as follows: "2. Ambient air that enters the building though intentional openings for natural ventilation or by infiltration is not required to be filtered."
    - Change is needed since outdoor air was added to section 605.1
    - Change is needed to clarify that only ambient outdoor air that is brought in through mechanical ventilation systems is required to be filtered.
        - See definition below of outdoor air
    - Outdoor air should be in italics as a defined term
5. 605.4. Exception 2: Change text to "Exhaust or relief air upstream of a…"
    - Upstream of sounds better than upstream from…

Other comments that may or may not be editorial but based on the addition of Recirculated Air in 605.1:

A. Note that as written the proposed code language will require MERV 13 or MERV 8 filters (depending on if under 605.1 item #1 or #2) on ducted series and parallel fan powered terminal unit VAV boxes. These terminal units typically only have options for 1" deep filter racks. MERV 13 filtration is not feasible for 1" standard factory filter rack at these velocities.
    a. This impact was not specifically discussed at the Mechanical TAG meeting as far as I remember.
    b. Fan powered terminal units typically only have unwetted heating elements or coils.
    c. **Recommended Change: Add new exception to 605.4 as follows:** "3. Recirculated air at fan powered variable air volume terminal units with hydronic heating coils or electric resistance heating elements shall have a filter not less than MERV 8."

B. Note will require filters on heating coils that only serve recirculated air. This could be interpreted that cabinet and unit heaters (electric or fossil fuel) require filters – these units are not currently manufactured with filters. This could be interpreted that hydronic heating coils require filters.
    a. ASHRAE 62.1 only requires filters at systems with wetted coils. See excerpt below.
    b. Based on clarification that recirculated air requires filtration and removal of language about wetted coils this may have a broader reach than intended.
    c. An electric heating element or fossil fuel heat exchanger would be considered a heat exchanger. See definition below.
    d. **Recommended Change: Add new exception to 605.1 as follows:** "3. Recirculated air serving systems without wetted cooling coils and with unducted heater (hydronic coils, fossil fuel heating elements or electric resistance heating elements) do not require filtration at the terminal device."

ASHRAE 62.1-2019 Excerpt:

5.9 Particulate Matter Removal. Particulate matter filters or air cleaners having either

a. a MERV of not less than 8 where rated in accordance with ASHRAE Standard 52.2 or
b. the minimum efficiency within ISO ePM10 where rated in accordance with ISO 16890

shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space.

Exception to 5.9: Cooling coils that are designed, controlled, and operated to provide sensible cooling only.

HEAT EXCHANGER. A device that transfers heat from one medium to another.

Definitions for Reference:

AIR. Air supplied to mechanical *equipment* and *appliances* for *combustion*, ventilation, cooling and similar purposes. Standard air is air at standard temperature and pressure, namely, 70°F (21°C) and 29.92 inches of mercury (101.3 kPa).

AIR, EXHAUST. Air being removed from any space, *appliance* or piece of *equipment* and conveyed directly to the atmosphere by means of openings or ducts.

AIR, MAKEUP. Any combination of outdoor and transfer air intended to replace *exhaust air* and exfiltration.

AIR, OUTDOOR. Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

AIR, TRANSFER. Air moved from one indoor space to another.

RETURN AIR. Air removed from an *approved* conditioned space or location and recirculated or exhausted.

RECIRCULATED AIR. Air removed from a conditioned space and intended for reuse as supply air.

SUPPLY AIR. That air delivered to each or any space supplied by the air distribution system or the total air delivered to all spaces supplied by the air distribution system, which is provided for ventilating, heating, cooling, humidification, dehumidification and other similar purposes.

RELIEF AIR. Exhausted return air from a system that provides ventilation for human usage.

REPLACEMENT AIR. Outdoor air that is used to replace air removed from a building through an exhaust system. Replacement air may be derived from one or more of the following: Makeup air, supply air, transfer air, and infiltration. However, the ultimate source of all replacement air is outdoor air. When replacement air exceeds exhaust, the result is exfiltration.

Thanks,

Eric Vander Mey
Principal | Chief of Engineering
P.E., LEED AP

RUSHING
D 206.285.7114 | **M** 206.321.1677
rushingco.com