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HVAC Plan Review Requirements

In order to expedite the plan review process, the following items are required when submitting plans for HVAC plan review:

1. PDF of plans saved to scale (on correct paper size, to allow for plans to be printed to scale).
2. Specify which currently adopted codes are being used in design.
3. Equipment schedule along with the outside ventilation air calculations **broken down** for compliance with the currently adopted IMC (See IMC section 403.3.1.1.1.1). This includes commercial hoods and make up air.
 - a. Show zone air distribution effectiveness numbers per IMC table 403.3.1.1.1.2 in ventilation calcs.
 - b. Show ventilation calcs, and air balancing schedule as part of ventilation calcs.
 - c. A balance report will be required at final inspection
4. Show condensate overflow protection per IMC section 307.2.3.1
5. Provide structural calculations for equipment loads to roof structures.
6. Show compliance with currently adopted IECC. (Especially IECC section C403.5)
7. Show method of controls for ventilation air. (Interlocks, timers, thermostats, etc.)
8. Show method of guard protection where required for equipment located on an elevated structure. (<10' from roof edge).
9. Location of duct smoke detectors where required.
10. Show combustion air for appliances. (Per IMC Chapter 7 & the 2018 IFGC)
11. Show all duct work with fire/smoke dampers penetrating any fire rated assembly.
12. All designs for hazardous spaces or rooms will require **engineered plans**. This includes, but is not limited to, paint booths, wood working facilities, & repair garages.
13. **Engineered plans** may also be required where special conditions exist. (ie., Parking garages, Type 1 hoods, certain types of manufacturing, etc.)
14. If mechanical ventilation is used to reduce the classified area classification (per NEC & NFPA) in a repair garage, paint area, or woodshop, please show on plans exactly how ventilation system will operate (24 hr operation, while occupied, interlocks, method of controls, etc.).

***Please note that it is impossible to list every item of concern that may come up during a plan review process. All plans submitted are subject to review for compliance with all of the currently adopted IMC, IECC and IFGC.**

2018 IMC Ventilation Air Sizing

- Section 403.3.1.1.1 requires zone outdoor airflow to be in accordance with all three sections 403.3.1.1.1.1(Vbz), 403.1.1.1.2 (Ez) and 403.3.1.1.1.3 (Voz).
- Step #1 section 403.3.1.1.1.1 breathing zone(Vbz) outdoor airflow to be calculated as shown:

$$Vbz = R_p \times P_z + R_a \times A_z$$

Az= Zone floor area.

Pz= Zone population.

Rp= People outdoor rate.

Ra= Area outdoor air rate.

Example for a 750 sq. ft. conference room:

Az= 750 sq. ft.

Pz= 37.5 occupants (default density of 50 per 1,000 sq. ft.)

Rp= 5 cfm

Ra= 0.06 cfm per sq. ft.

Vbz = (5 cfm x 37.5 occup.) + (0.06 x 750 sq . ft.) = 232.5 cfm

- Step #2 section 403.3.1.1.1.2 zone air distribution effectiveness (Ez) determined using table 403.3.1.1.1.2.

We will use $E_z=0.8$ (ceiling supply of warm air and ceiling return from table 403.3.1.2) for our example.

- Step #3 section 403.3.1.1.1.3 zone outdoor airflow (Voz) determined in accordance with Equation 4-2 ($V_{oz} = V_{bz} + E_z$):

$V_{oz} = 232.5 + 0.8 = 290.6$ cfm of total OA required for our conference room.

*Unfortunately we are not done yet! Section 403.3.1.1.2 must now be figured out.

Section 403.3.1.1.2 determines the final outdoor air (Vot) to be required for the ventilation system.

Section 403.3.1.1.2.1 for our conference room with a single zone system would be 290.6 cfm ($V_{ot} = V_{oz}$).

Section 403.3.1.1.2.2 determines the final outdoor air (Vot) to be required for 100 percent outdoor air system.

Section 403.3.1.1.2.3 for multi zone systems is more complex. Our example only has one air handler with one zone. See the definition of "zone" for more details.