

Evaluating Existing System's Ability to Increase OA in Lieu of RA

For existing systems where the OA and return air (RA) mix, an evaluation should be made to determine whether there is excess cooling and heating capacity available to accept an increase in the amount of outside air. A "back of the envelope" calculation yields the following results and observations:

1. At Philadelphia summer design conditions, the cooling load will roughly increase 4 tons for every 1000 CFM of additional OA in lieu of RA. (These 4 tons are the cooling required to get the additional OA down to the RA conditions for which the unit was originally designed.)
2. At Philadelphia winter design conditions, the heating load will increase roughly 65,000 BTUH for every 1000 CFM of additional OA in lieu of RA.
3. If the unit (coils/heat exchangers) can increase in capacity, are the electrical and gas (if present) services sized to handle the additional "new" requirements?
4. If the coils are water (a chiller/boiler hydronic system), can the pumps handle the required increase in flow and head?

If the existing system is one where ventilation air is treated separately through a 100% OA unit or a DOAS, the preceding items still apply, but with some additional observations:

1. Increasing the OA by 1000 CFM will also increase the cooling load by roughly 6.5 tons at Philadelphia design conditions.
2. You must now be aware of coil face and filter velocities, increased static pressure, increased motor bhp, increased filter loading, and duct velocities as you increase CFM on existing DOAS or 100% OA systems.