ENGINEERING WHITE PAPER

Internal use only

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Coil Cleaning Access per ASHRAE Standard 62.1

When selecting an air handling with two coils in series, we may need to include a minimum 18" access plenum between coils per ASHRAE 62.1-2019 paragraph 5.13.2 as follows:

5.13.2 Finned-Tube-Coil Selection for Cleaning. Individual finned-tube coils or multiple finned-tube coils in series without intervening access spaces of at least 18 in. (457 mm) shall be selected to result in no more than 0.75 in. of water (187 Pa) combined dry-coil pressure drop at 500 fpm (2.54 m/s) face velocity.

The key parts of this requirement are the conditions of 500 FPM and a DRY coil. Modeled at these conditions, if the total airside pressure drop through both coils is ≤ 0.75", then no access plenum is required between the coils.

However, if the combined pressure drop is > 0.75" then you'll need to provide an access plenum of at least 18" to allow cleaning between the coils.

To model coils at these conditions depends on which manufacturer you're using. With Nortek Air Solutions and DA, it's a relatively easy thing to accomplish.

In the example below, we have a 10,000 CFM cooling coil at 414 FPM with an airside pressure drop of 0.46", but this is a wet coil since we have latent capacity.

Airflow					Entering Air Temps		Fluid					Leaving Air Temps		Capacity	
Airflow (%)	Bypass (%)	Leaving (ACFM)	Velocity (ft/min)	APD (in.H20)	Dry Bulb (°F)	Wet Bulb (°F)	Entering Temp (°F)	Leaving Temp (°F)	Flow Rate (GPM)	Velocity (ft/s)	PD (ft.H20)	Dry Bulb (°F)	Wet Bulb (°F)	Sensible (MBH)	Total (MBH)
100.00	0.00	10,000	414	0.46	80.0	67.0	45.0	55.0	78.6	4.85	12.49	54.2	53.5	270.0	394.5

To model this coil at 500 FPM, simply override the CFM. Airflow rate and coil velocity are linearly related, so the airflow at 500 FPM = 10,000 x (500/414) = 12,077.

To model a dry coil, we can either drop the entering wet bulb temperature or increase the chilled water temperature. In the example below, we're using an entering wet bulb temperature of 53°F to get a dry coil and the pressure drop is 0.44". You'll note that reducing the wet bulb may change the air density and affect the velocity calculation, which is now shown as 496 FPM, but the APD is the same 0.44" at 500 FPM.

Airflow					Entering Air Temps		Fluid					Leaving Air Temps		Capacity	
Airflow (%)	Bypass (%)	Leaving (ACFM)	Velocity (ft/min)	APD (in.H20)	Dry Bulb (°F)	Wet Bulb (°F)	Entering Temp (°F)	Leaving Temp (°F)	Flow Rate (GPM)	Velocity (ft/s)	PD (ft.H20)	Dry Bulb (°F)	Wet Bulb (°F)	Sensible (MBH)	Total (MBH)
120.77	0.00	12,077	496	0.44	80.0	53.0	45.0	55.0	66.1	4.07	10.84	53.6	40.8	332.2	332.2

With a chilled water coil pressure drop of 0.44", as long as the pressure drop through the pre-heat coil at 500 FPM is ≤ 0.31" (combined 0.75" through both coils), we won't need an access plenum between the coils.

If using Daikin Tools to design a Vision or Skyline unit, the process is a bit more tedious. DST doesn't allow us to rate a component at an airflow higher than the unit design airflow. So you'll need to copy the tag, change the airflow to get 500 FPM coil velocity and run the same coil to calculate the airside pressure drop. (You can specify the rows and fins per inch in the physical data tab.) You can delete the copied tag after running this simulation.Alternately, you can calculate the approximate pressure drop using the fan laws; Pressure drop varies with the square of the velocity, so PD2 = (500/FPM1)2 x PD1. For example, if the coil PD at 425 FPM is 0.40", the PD at 500 FPM will be approximately (500/414)2 x 0.40 = 0.58".

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