AboveAir Technologies

Design Note: Space Dehumidification Design Tips

With decades of experience in manufacturing, designing, and troubleshooting HVAC equipment, AboveAir has seen space dehumidification frequently present a challenge in installations. The following tips reflect many of the lessons we have learned in assisting building owners, contractors, and engineers achieve the aims of their designs.

Tip 1: Make sure your architect is aware that maintaining the humidity in your space is critical. If your space is not designed with a proper vapor barrier, no amount of design work on your part will be able to control the space conditions.

Tip 2: Make sure you compare the airflows required to meet both your sensible and latent loads if you are designing spaces such as fitness studios, high density office spaces/conference rooms, or restaurants. Designing by sensible load only may result in spaces that are unable to maintain acceptable humidity levels.

Tip 3: Medium temperature HVAC equipment typically delivers supply air temperatures off of the cooling coil in the range of 50°F DB to 60°F DB. For dehumidification, the supply air temperature off of the cooling coil will ideally be 50°F DB - 55°F DB. For spaces with high latent loads, target 50°F DB.

Tip 4: Your air must be dryer than the condition you are trying to maintain. The tables below give sample space conditions and supply air conditions off the cooling coil. For each condition, the capability of the unit to dehumidify the space is shown in latent load / 1,000 CFM is provided.

55°F DB/54°F WB Off Cooling Coil		
Space °F DB Design	Space %RH Design	BTUh Latent/1,000 CFM
67	50	Use Lower Supply Temp
69	50	Use Lower Supply Temp
71	50	Use Lower Supply Temp
73	50	Use Lower Supply Temp
75	50	2,856

52.5°F DB/51.5°F WB Off Cooling Coil		
Space °F DB Design	Space %RH Design	BTUh Latent/1,000 CFM
67	50	Use Lower Supply Temp
69	50	Use Lower Supply Temp
71	50	1,020
73	50	3,740
75	50	6,664

50°F DB/49°F WB Off Cooling Coil		
Space °F DB Design	Space %RH Design	BTUh Latent/1,000 CFM
67	50	Requires supplemental desiccant system
69	50	1,904
71	50	4,488
73	50	7,208
75	50	10,132

Tip 5: Specify hot gas reheat with DX systems. Hot gas reheat is essentially a condensing coil mounted after the cooling coil. This coil uses waste energy to reheat the air during conditions where your space requires dehumidification but does not require cooling. This is the most energy-friendly option available for reheat operation in the industry.

Tip 6: In spaces where dehumidification control and tight temperature control are required, specify SCR electric as the primary reheat stage in lieu of hot gas reheat. SCR reheat provides the quickest response and tightest control of any available heat/reheat option.

Tip 7: Provide preheat to keep your compressor operating for spaces where humidity control is critical and you may experience no/low load conditions. Even with hot gas bypass or digital scroll compressors, the return air temperature may drop too low to allow the compressor to continue to operate. During the compressor's off cycle, the space humidity will rebound as condensate from the unit is entrained in the air (verify possibilty with local energy codes and waivers).

For more information or assistance in selecting the right product for your application, contact sales@aboveair.com or visit http://www.aboveair.com.